

Modelling and Analysis of Induction Motor using LabVIEW

E.Ramprasath, P.Manojkumar

Department of Electrical and Electronics Engineering, K.S.Rangasamy College of Technology

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ABSTRACT

Induction motor characteristics became complex to study, after the invention of drives where the motor incorporated with power electronic switches such as thyristor, diodes, GTO, and MOSFET. Induction motor characteristics can be studied and modelled with software such as Finite Element Analysis and Laboratory Virtual Instrument Engineering Workbench. Finite Element Analysis is used to study and model the motor might be complex and the time taken to compute was unreliable. In this paper induction motor was modelled with the help of LabVIEW software this allows us to model and simulate the motor in order to analyse the performance. The induction motor modelled here was based on the mathematical equations.

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Corresponding Author:

E.Ramprasath,
Department of Electrical and Electronics Engineering,
K.S.Rangasamy College of Technology,
K.S.R Kalvi Nagar, Tiruchengode, Namakkal - 637215, Tamil Nadu, India.
Email: ramprasath009@gmail.com

1. INTRODUCTION

Induction motor designing based on the equation is bit complex, because equation whose terms are not of the first degree and more over it is a strongly coupled system. The input and output variable relationship is almost complex thus simulation of induction motor physically is hard. Most commonly employed software are PSpice, Finite Element Analysis, Matrix Laboratory and Laboratory Virtual Instrument Engineering Workbench other software rather than is, are created based on the text lines. LabVIEW software is based on the graphical programming environment. LabVIEW software has a dynamic nature which contributes to this dynamic tracking of processing the data. The changes in this data can be observed continuously. Dynamic analyzing is established based on both the mathematical and physical model. Normally equivalent circuit of induction motor resembles the equivalent circuit of transformer where the airgap between the stator and rotor in the induction motor differentiate from the transformer. LabVIEW software of following qualities such as multi-dimensional plots, xy graphs, report generation in excel, word makes this software accessible and has a unique feature, which simplifies the simulation process [1].

The dynamic and steady state analysis of induction motor are difficult to compute so modelling a motor using mathematical model helps to eliminate the further consequences. So the determination of parameters must be accurate for carrying out multiple analysis. Machine performance changes as the coupled system inertia changes it also contributes to the change in the load torque. Motor constancy changes if the motor inertia and load torque of that motor changes. Identifying faults in electric motor using LabVIEW is growing research area where many researchers giving their valuable contribution to find out faults in motor. Electric motor comprises of numerous motor which are developed and improved day by day in that induction motor monitoring and faults diagnosis is a feature rich area because induction motor is the widely used motor which occupies nearly 75 % of drives in industries so only they're widely known as the work horse of an industry [2-3].

Dynamic Modeling Of Induction Motor Using Labview

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Engineering & ICT ,2007 Organized by Universiti Teknikal Malaysia Melaka **Nonlinear Dynamics and Control in Process Engineering — Recent Advances** G. Continillo,S. Crescitelli,M. Giona,2012-12-06 The book is a collection of peer reviewed articles on dynamics control and simulation of chemical processes It covers a variety of different methods for approaching process dynamics and control including bifurcation analysis computational fluid dynamics neural network applications numerical simulations of partial differential equations process identification and control Lagrangian analysis of mixing The book is intended both for scientists and engineering involved in process analysis and control and for researchers system engineering mathematicians and physicists interested in nonlinear sciences It provides an overview of the typical problems of chemical and process engineering in which dynamical system theory finds a significant and fertile field of applications International Congress and Workshop on Industrial AI 2021 Ramin Karim,Alireza Ahmadi,Iman Soleimanmeigouni,Ravdeep Kour,Raj Rao,2022-02-07 This proceedings of the International Congress and Workshop on Industrial AI 2021 encompasses and integrates the themes and topics of three conferences eMaintenance Condition Monitoring and Diagnostic Engineering management COMADEM and Advances in Reliability Maintainability and Supportability ARMS into a single resource The 21st century is witnessing the emerging extensive applications of Artificial Intelligence AI and Information Technologies IT in industry Industrial Artificial Intelligence IAI integrates IT with Operational Technologies OT and Engineering Technologies ET to achieve operational excellence through enhanced analytics in operation and maintenance of industrial assets This volume provides insight into opportunities and challenges caused by the implementation of AI in industries apart from future developments with special reference to operation and maintenance of industrial assets Industry practitioners in the maintenance field as well as academics seeking applied research in maintenance will find this text useful **Energy Storage Systems and Power Conversion Electronics for E-Transportation and Smart Grid** Sergio Saponara,Lucian Mihet-Popa,2020-12-02 This is a reprint in book form of the Energies MDPI Journal Special Issue entitled Energy Storage Systems and Power Conversion Electronics for E Transportation and Smart Grid The Special Issue was managed by two Guest Editors from Italy and Norway Professor Sergio Saponara from the University of Pisa and Professor Lucian MIHET POPA from stfold University College in close cooperation with the Editors from Energies The papers published in this SI are related to the emerging trends in energy storage and power conversion electronic circuits and systems with a specific focus on transportation electrification and on the evolution from the electric grid to a smart grid An extensive exploitation of renewable energy sources is foreseen for the smart grid as well as a close integration with the energy storage and recharging systems of the electrified transportation era Innovations at the levels of both algorithmic and hardware i e power converters electric drives electronic control units ECU energy storage modules and charging stations are proposed Research and technology transfer activities in energy storage systems such as

batteries and super ultra capacitors are essential for the success of electric transportation and to foster the use of renewable energy sources Energy storage systems are the key technology to solve these issues and to increase the adoption of renewable energy sources in the smart grid IAS '97 IEEE Industry Applications Society. Meeting,IEEE Industry Applications Society,1997 Power control of industrial processes is the major focus of the papers presented at the 1997 IEEE Industry Applications Society Conference which are covered in this text Advances in Soft Computing Ildar Batyrshin,Grigori Sidorov,2011-11-22 The two volume set LNAI 7094 and 7095 constitutes the refereed proceedings of the 10th Mexican International Conference on Artificial Intelligence MICA 2011 held in Puebla Mexico in November December 2011 The 96 revised papers presented were carefully selected from XXX submissions The second volume contains 46 papers focusing on soft computing The papers are organized in the following topical sections fuzzy logic uncertainty and probabilistic reasoning evolutionary algorithms and other naturally inspired algorithms data mining neural networks and hybrid intelligent systems and computer vision and image processing **Intelligent Environmental Sensing** Henry Leung,Subhas Chandra Mukhopadhyay,2015-01-22 Developing environmental sensing and monitoring technologies become essential especially for industries that may cause severe contamination Intelligent environmental sensing uses novel sensor techniques intelligent signal and data processing algorithms and wireless sensor networks to enhance environmental sensing and monitoring It finds applications in many environmental problems such as oil and gas water quality and agriculture This book addresses issues related to three main approaches to intelligent environmental sensing and discusses their latest technological developments Key contents of the book include Agricultural monitoring Classification detection and estimation Data fusion Geological monitoring Motor monitoring Multi sensor systems Oil reservoirs monitoring Sensor motes Water quality monitoring Wireless sensor network protocol **Integration of Electric Vehicles and Battery Storage Systems** Hrvoje Pandžić,2021-04-22 Achieving the goal of green and environmentally friendly energy systems is not possible without the concept of energy storage Such storage should charge when renewable generation e g photovoltaics and wind farms is abundant and discharge during periods of its scarcity Although pumped hydropower plants have been widely used as extremely large capacity energy storage the recent technological developments in lithium based batteries have made them economically feasible The major advantages of batteries over a conventional energy storage system i e hydropower include its modularity and ease of integration with the transport system This Special Issue is thus focused on both stationary batteries and mobile batteries in electric vehicles Both should be used to provide flexibility and balancing services to power systems While stationary batteries are focused solely on the power system the batteries within electric vehicles need to primarily fulfill the task of providing energy for transportation This is why their use in power systems is secondary However due to generally long parking periods they can become a detrimental asset in terms of balancing the power system

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Karim,2010-01-30 Technological Developments in Education and Automation includes set of rigorously reviewed world class manuscripts dealing with the increasing role of technology in daily lives including education and industrial automation Technological Developments in Education and Automation contains papers presented at the International Conference on Industrial Electronics Technology Automation and the International Conference on Engineering Education Instructional Technology Assessment and E learning which were part of the International Joint Conferences on Computer Information and Systems Sciences and Engineering Handbook of Research on Emerging Technologies for Electrical Power Planning, Analysis, and Optimization Shandilya, Smita,Shandilya, Shishir,Thakur, Tripta,Nagar, Atulya K.,2016-02-26 As the demand for efficient energy sources continues to grow around the globe electrical systems are becoming more essential in an effort to meet these increased needs As these systems are being utilized more frequently it becomes imperative to find ways of optimizing their overall function The Handbook of Research on Emerging Technologies for Electrical Power Planning Analysis and Optimization features emergent methods and research in the systemic and strategic planning of energy usage Highlighting theoretical perspectives and empirical research this handbook is a comprehensive reference source for researchers practitioners students and professionals interested in the current advancements and efficient use in power systems Index to Theses with Abstracts Accepted for Higher Degrees by the Universities of Great Britain and Ireland and the Council for National Academic Awards ,2003 *Wind Turbines* Abdel Ghani Aissaoui,Ahmed Tahour,2016-07-27 Renewable energies constitute excellent solutions to both the increase of energy consumption and environment problems Among these energies wind energy is very interesting Wind energy is the subject of advanced research In the development of wind turbine the design of its different structures is very important It will ensure the robustness of the system the energy efficiency the optimal cost and the high reliability The use of advanced control technology and new technology products allows bringing the wind energy conversion system in its optimal operating mode Different strategies of control can be applied on generators systems relating to blades etc in order to extract maximal power from the wind The goal of this book is to present recent works on design control and applications in wind energy conversion systems Science Abstracts ,1995 Computer & Control Abstracts ,1996 **Proceedings of the IEEE International Symposium on Industrial Electronics** ,1997 **Proceedings of the ... IEEE Instrumentation and Measurement Technology Conference** ,1997 Advances in Mechatronics and Machinery Dong Ming Guo,Liding Wang,Zhenyuan Jia,Junsheng Liang,Dazhi Wang,2017-07-24 20th ICMT 2016 Selected peer reviewed papers from the 20th International Conference on Mechatronics Technology ICMT2016 October 28 31 2016 Dalian P R China ISIE ... ,1997 IECON '98 IEEE Industrial Electronics Society. Conference,1998 **Index to IEEE Publications** Institute of Electrical and Electronics Engineers,1998 Issues for 1973 cover the entire IEEE technical literature

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 - Chapter 5: Conclusion
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Table of Contents Dynamic Modeling Of Induction Motor Using Labview

1. Understanding the eBook Dynamic Modeling Of Induction Motor Using Labview
 - The Rise of Digital Reading Dynamic Modeling Of Induction Motor Using Labview
 - Advantages of eBooks Over Traditional Books
2. Identifying Dynamic Modeling Of Induction Motor Using Labview
 - Exploring Different Genres
 - Considering Fiction vs. Non-Fiction
 - Determining Your Reading Goals
3. Choosing the Right eBook Platform
 - Popular eBook Platforms
 - Features to Look for in an Dynamic Modeling Of Induction Motor Using Labview
 - User-Friendly Interface
4. Exploring eBook Recommendations from Dynamic Modeling Of Induction Motor Using Labview
 - Personalized Recommendations
 - Dynamic Modeling Of Induction Motor Using Labview User Reviews and Ratings
 - Dynamic Modeling Of Induction Motor Using Labview and Bestseller Lists
5. Accessing Dynamic Modeling Of Induction Motor Using Labview Free and Paid eBooks
 - Dynamic Modeling Of Induction Motor Using Labview Public Domain eBooks
 - Dynamic Modeling Of Induction Motor Using Labview eBook Subscription Services
 - Dynamic Modeling Of Induction Motor Using Labview Budget-Friendly Options
6. Navigating Dynamic Modeling Of Induction Motor Using Labview eBook Formats
 - ePub, PDF, MOBI, and More
 - Dynamic Modeling Of Induction Motor Using Labview Compatibility with Devices
 - Dynamic Modeling Of Induction Motor Using Labview Enhanced eBook Features
7. Enhancing Your Reading Experience
 - Adjustable Fonts and Text Sizes of Dynamic Modeling Of Induction Motor Using Labview
 - Highlighting and Note-Taking Dynamic Modeling Of Induction Motor Using Labview
 - Interactive Elements Dynamic Modeling Of Induction Motor Using Labview

8. Staying Engaged with Dynamic Modeling Of Induction Motor Using Labview
 - Joining Online Reading Communities
 - Participating in Virtual Book Clubs
 - Following Authors and Publishers Dynamic Modeling Of Induction Motor Using Labview
9. Balancing eBooks and Physical Books Dynamic Modeling Of Induction Motor Using Labview
 - Benefits of a Digital Library
 - Creating a Diverse Reading Collection Dynamic Modeling Of Induction Motor Using Labview
10. Overcoming Reading Challenges
 - Dealing with Digital Eye Strain
 - Minimizing Distractions
 - Managing Screen Time
11. Cultivating a Reading Routine Dynamic Modeling Of Induction Motor Using Labview
 - Setting Reading Goals Dynamic Modeling Of Induction Motor Using Labview
 - Carving Out Dedicated Reading Time
12. Sourcing Reliable Information of Dynamic Modeling Of Induction Motor Using Labview
 - Fact-Checking eBook Content of Dynamic Modeling Of Induction Motor Using Labview
 - Distinguishing Credible Sources
13. Promoting Lifelong Learning
 - Utilizing eBooks for Skill Development
 - Exploring Educational eBooks
14. Embracing eBook Trends
 - Integration of Multimedia Elements
 - Interactive and Gamified eBooks

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