

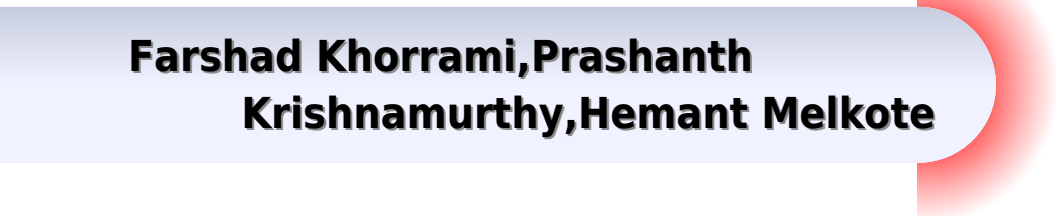
Modeling and High-Performance Control of Electric Machines



JOHN CHIASSON

Modeling And High Performance Control

**Farshad Khorrami, Prashanth
Krishnamurthy, Hemant Melkote**



Modeling And High Performance Control:

Modeling and High Performance Control of Electric Machines John Chiasson, 2005-05-13 Modeling and High Performance Control of Electric Machines introduces you to both the modeling and control of electric machines The direct current DC machine and the alternating current AC machines induction PM synchronous and BLDC are all covered in detail The author emphasizes control techniques used for high performance applications specifically ones 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 Graduate students studying power 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 Instructor Support materials are also available Email IAline@wiley.com *High Performance*

Control of AC Drives with Matlab / Simulink Models Haitham Abu-Rub, Atif Iqbal, Jaroslaw Guzinski, 2012-04-13 A comprehensive guide to understanding AC machines with exhaustive simulation models to practice design and control Nearly seventy percent of the electricity generated worldwide is used by electrical motors Worldwide huge research efforts are being made to develop commercially viable three and multi phase motor drive systems that are economically and technically feasible Focusing on the most popular AC machines used in industry induction machine and permanent magnet synchronous machine this book illustrates advanced control techniques and topologies in practice and recently deployed Examples are drawn from important techniques including Vector Control Direct Torque Control Nonlinear Control Predictive Control multi phase drives and multilevel inverters Key features include systematic coverage of the advanced concepts of AC motor drives with and without output filter discussion on the modelling analysis and control of three and multi phase AC machine drives including the recently developed multi phase phase drive system and double fed induction machine description of model predictive control applied to power converters and AC drives illustrated together with their simulation models end of chapter questions with answers and PowerPoint slides available on the companion website www.wiley.com/go/aburub_control This book integrates a diverse range of topics into one useful volume including most the latest developments It provides an effective guideline for students and professionals on many vital electric drives aspects It is an advanced textbook for final year undergraduate and graduate students and researchers in power electronics electric drives and motor control It is also a handy tool for specialists and practicing engineers wanting to develop and verify their own algorithms and techniques

High Performance Control of AC Drives with Matlab/Simulink Haitham Abu-Rub, Atif Iqbal, Jaroslaw Guzinski, 2021-05-11 High Performance Control of AC Drives with Matlab Simulink Explore this indispensable update to a popular graduate text on electric drive techniques and the latest converters used in industry The Second Edition of High Performance Control of AC Drives with Matlab Simulink delivers an updated and thorough overview of topics central to the understanding of AC motor

drive systems The book includes new material on medium voltage drives covering state of the art technologies and challenges in the industrial drive system as well as their components and control current source inverter based drives PWM techniques for multilevel inverters and low switching frequency modulation for voltage source inverters This book covers three phase and multiphase more than three phase motor drives including their control and practical problems faced in the field e g adding LC filters in the output of a feeding converter are considered The new edition contains links to Matlab Simulink models and PowerPoint slides ideal for teaching and understanding the material contained within the book Readers will also benefit from the inclusion of A thorough introduction to high performance drives including the challenges and requirements for electric drives and medium voltage industrial applications An exploration of mathematical and simulation models of AC machines including DC motors and squirrel cage induction motors A treatment of pulse width modulation of power electronic DC AC converter including the classification of PWM schemes for voltage source and current source inverters Examinations of harmonic injection PWM and field oriented control of AC machines Voltage source and current source inverter fed drives and their control Modelling and control of multiphase motor drive system Supported with a companion website hosting online resources Perfect for senior undergraduate MSc and PhD students in power electronics and electric drives High Performance Control of AC Drives with Matlab Simulink will also earn a place in the libraries of researchers working in the field of AC motor drives and power electronics engineers in industry

High Performance Control Teng-Tiow Tay,Iven Mareels,John B. Moore,2012-12-06 The engineering objective of high performance control using the tools of optimal control theory robust control theory and adaptive control theory is more achievable now than ever before and the need has never been greater Of course when we use the term high performance control we are thinking of achieving this in the real world with all its complexity uncertainty and variability Since we do not expect to always achieve our desires a more complete title for this book could be Towards High Performance Control To illustrate our task consider as an example a disk drive tracking system for a portable computer The better the controller performance in the presence of eccentricity uncertainties and external disturbances such as vibrations when operated in a moving vehicle the more tracks can be used on the disk and the more memory it has Many systems today are control system limited and the quest is for high performance in the real world

Modeling and Adaptive Nonlinear Control of Electric Motors Farshad Khorrami,Prashanth Krishnamurthy,Hemant Melkote,2003-05-21 In this book modeling and control design of electric motors namely step motors brushless DC motors and induction motors are considered The book focuses on recent advances on feedback control designs for various types of electric motors with a slight emphasis on stepper motors For this purpose the authors explore modeling of these devices to the extent needed to provide a high performance controller but at the same time one amenable to model based nonlinear designs The control designs focus primarily on recent robust adaptive nonlinear controllers to attain high performance It is shown that the adaptive robust nonlinear controller on its own achieves

reasonably good performance without requiring the exact knowledge of motor parameters While carefully tuned classical controllers often achieve required performance in many applications it is hoped that the advocated robust and adaptive designs will lead to standard universal controllers with minimal need for fine tuning of control parameters NASA *Workshop on Distributed Parameter Modeling and Control of Flexible Aerospace Systems*, 1994

Advances in Future Manufacturing Engineering Guohui Yang, 2015-06-11 The International Conference on Future Manufacturing Engineering ICFME 2014 was held in Hong Kong December 10 11 2014 It gathered academics industry managers and experts manufacturing engineers university students all interested or proficient in the field of manufacturing engineering including research design and development of systems p

Mathematical Modeling in Agriculture Sabyasachi Pramanik, Niranjanamurthy M., Ankur Gupta, Ahmed J. Obaid, 2024-11-20 The main goal of the book is to explore the idea behind data modeling in smart agriculture using information and communication technologies and tools to make agricultural practices more functional fruitful and profitable The research in the book looks at the likelihood and level of use of implemented technological components with regard to the adoption of different precision agricultural technologies To identify the variables affecting farmers choices to embrace more precise technology zero inflated Poisson and negative binomial count data regression models were utilized Outcomes from the count data analysis of a random sample of various farm operators show that various aspects including farm dimension farmer demographics soil texture urban impacts farmer position of liabilities and position of the farm in a state were significantly associated with the approval severity and likelihood of precision farming technologies Farm management information systems FMIS have constantly advanced in complexity as they have incorporated new technology the most recent of which is the internet However few FMIS have fully tapped into the internet s possibilities and the newly developing idea of precision agriculture receives little or no support in the FMIS that are now being sold FMIS for precision agriculture must meet a few more criteria beyond those of regular FMIS which increases the technological complexity of these systems deployment in a number of ways In order to construct an FMIS that meet these extra needs the authors here evaluated various cutting edge web based methods The goal was to determine the requirements that precision agriculture placed on FMIS

Iterative Identification and Control Pedro Albertos, Antonio Sala Piqueras, 2012-12-06 An exposition of the interplay between the modelling of dynamic systems and the design of feedback controllers based on these models is the main goal of this book The combination of both subjects into a cohesive development allows the consistent treatment of both problems to yield powerful new tools for the improvement of system performance Central among the themes of this work is the observation that operation of a system in feedback with a controller exposes the areas in which the model fit is constraining the controller performance achieved The book presents new techniques for the understanding of the iterative improvement of performance through the successive fitting of models using closed loop data and the design of high performance controllers using these models The subject matter includes New approaches to

understanding how to affect the fit of dynamical models to physical processes through the choice of experiments data pre filtering and model structure connections between robust control design methods and their dependency on the quality of model fit experimental design in which data collected in operation under feedback can reveal areas that limit the performance achieved iterative approaches to link these model fitting and control design phases in a cogent manner so as to achieve improved performance overall The authors of individual chapters are some of the most renowned and authoritative figures in the fields of system identification and control design *European Control Conference 1993* ,1993-06-28
Proceedings of the European Control Conference 1993 Groningen Netherlands June 28 July 1 1993

Modeling And High Performance Control: Bestsellers in 2023 The year 2023 has witnessed a noteworthy surge in literary brilliance, with numerous captivating novels captivating the hearts of readers worldwide. Lets delve into the realm of bestselling books, exploring the captivating narratives that have captivated audiences this year. The Must-Read : Colleen Hoover "It Ends with Us" This touching tale of love, loss, and resilience has captivated readers with its raw and emotional exploration of domestic abuse. Hoover skillfully weaves a story of hope and healing, reminding us that even in the darkest of times, the human spirit can succeed. Modeling And High Performance Control : Taylor Jenkins Reids "The Seven Husbands of Evelyn Hugo" This spellbinding historical fiction novel unravels the life of Evelyn Hugo, a Hollywood icon who defies expectations and societal norms to pursue her dreams. Reids absorbing storytelling and compelling characters transport readers to a bygone era, immersing them in a world of glamour, ambition, and self-discovery. Modeling And High Performance Control : Delia Owens "Where the Crawdads Sing" This evocative coming-of-age story follows Kya Clark, a young woman who grows up alone in the marshes of North Carolina. Owens spins a tale of resilience, survival, and the transformative power of nature, captivating readers with its evocative prose and mesmerizing setting. These top-selling novels represent just a fraction of the literary treasures that have emerged in 2023. Whether you seek tales of romance, adventure, or personal growth, the world of literature offers an abundance of engaging stories waiting to be discovered. The novel begins with Richard Papen, a bright but troubled young man, arriving at Hampden College. Richard is immediately drawn to the group of students who call themselves the Classics Club. The club is led by Henry Winter, a brilliant and charismatic young man. Henry is obsessed with Greek mythology and philosophy, and he quickly draws Richard into his world. The other members of the Classics Club are equally as fascinating. Bunny Corcoran is a wealthy and spoiled young man who is always looking for a good time. Charles Tavis is a quiet and reserved young man who is deeply in love with Henry. Camilla Macaulay is a beautiful and intelligent young woman who is drawn to the power and danger of the Classics Club. The students are all deeply in love with Morrow, and they are willing to do anything to please him. Morrow is a complex and mysterious figure, and he seems to be manipulating the students for his own purposes. As the students become more involved with Morrow, they begin to commit increasingly dangerous acts. The Secret History is a exceptional and thrilling novel that will keep you wondering until the very end. The novel is a cautionary tale about the dangers of obsession and the power of evil.

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