# Dc Motor Position System Modeling Wordpress

Contributed articles presented in the seminar held during Jan. 5-7, 2005, at Kumaraguru College of Technology, Coimbatore.

This book describes the interplay of mechanics, electronics, electrotechnics, automation and biomechanics. It provides a broad overview of mechatronics systems ranging from modeling and dimensional analysis, and an overview of magnetic, electromagnetic and piezo-electric phenomena. It also includes the investigation of the pneumo-fluid-mechanical, as well as electrohydraulic servo systems, modeling of dynamics of an atom/particle embedded in the magnetic field, integrity aspects of the Maxwell's equations, the selected optimization problems of angular velocity control of a DC motor subjected to chaotic disturbances with and without stick-slip dynamics, and the analysis of a human chest adjacent to the elastic backrest aimed at controlling force to minimize relative compression of the chest employing the LQR. This book provides a theoretical background on the analysis of various kinds of mechatronics systems, along with their computational analysis, control, optimization as well as laboratory investigations.

This volume constitutes the refereed proceedings of the 7th Workshop on Engineering Applications, WEA 2020, held in Bogota, Colombia, in October 2020. The 32 revised full papers and 12 short papers presented in this volume were carefully reviewed and selected from 136 submissions. The papers are organized in the following topical sections: computational intelligence; computer science; optimization; bioengineering; military applications; simulation, IoT and networks; power applications.

Innovations and Advances in Computer, Information, Systems Sciences, and Engineering includes the proceedings of the International Joint Conferences on Computer, Information, and Systems Sciences, and Engineering (CISSE 2011). The contents of this book are a set of rigorously reviewed, world-class manuscripts addressing and detailing state-of-the-art research projects in the areas of Industrial Electronics, Technology and Automation, Telecommunications and Networking, Systems, Computing Sciences and Software Engineering, Engineering Education, Instructional Technology, Assessment, and E-learning.

This publication covers topics in the area of applied electromagnetics and mechanics. Since starting in Japan in 1988, the ISEM has become a well-known international forum on applied electromagnetics.

Collection of selected, peer reviewed papers from the 2014 International Conference on Machine Tool Technology and Mechatronics Engineering (ICMTTME 2014), June 22-23, 2014, Guilin, Guangxi, China. The 1440 papers are grouped as follows: Chapter 1: Applied Mechanics, Chapter 2: Measurement and Instrumentation, Monitoring, Testing and Detection Technologies, Chapter 3: Numerical Methods, Computation Methods and Algorithms for Modeling, Simulation and Optimization, Data Mining and Data Processing, Chapter 4: Information Technologies, WEB and Networks Engineering, Information Security, Software Application and Development, Chapter 5: Electronics and Microelectronics, Embedded and Integrated Systems, Power and Energy, Electric and Magnetic Systems, Chapter 6: Communication, Signal and Image Processing, Data Acquisition, Identification and Recognation Technologies, Chapter 7: Materials Processing and Manufacturing Technology, Industry Applications, Chapter 8: Civil and Structure Engineering, Architecture Science, Chapter 9: Bio- and Medical Applications, Chemistry Engineering, Resources and Environmental Engineering, Chapter 10: Advanced Information and Innovative Technologies for Management, Logistics, Economics, Marketing, Education, Assessment

Computer Aided Design of Multivariable Technological Systems covers the proceedings of the Second International Federation of Automatic Control (IFAC). The book reviews papers that discuss topics about the use of Computer Aided Design (CAD) in designing multivariable system, such as theoretical issues, applications, and implementations. The book tackles several topics relevant to the use of CAD in designing multivariable systems. Topics include quasi-classical approach to multivariable feedback system designs; fuzzy control for multivariable systems; root loci with multiple gain parameters; multivariable frequency domain stability criteria; and computational algorithms for pole assignment in linear multivariable systems. The text will be of great use to professionals whose work involves designing and implementing multivariable systems.

Masters Theses in the Pure and Applied Sciences was first conceived, published, and disseminated by the Center for Information and Numerical Data Analysis and Synthesis (CINDAS) * at Purdue University in 1957, starting its coverage of theses with the academic year 1955. Beginning with Volume 13, the printing and dissemination phases of the activity were transferred to University Microfilms/Xerox of Ann Arbor, Michigan, with the thougtit that such an arrangement would be more beneficial to the academic and general scientific and technical community. After five years of this joint undertaking we had concluded that it was in the interest of all con cerned if the printing and distribution of the volumes were handled by an interna tional publishing house to assure improved service and broader dissemination. Hence, starting with Volume 18, Masters Theses in the Pure and Applied Sciences has been disseminated on a worldwide basis by Plenum Publishing Cor poration of New York, and in the same year the coverage was broadened to include Canadian universities. All back issues can also be ordered from Plenum. We have reported in Volume 31 (thesis year 1986) a total of 11 ,480 theses titles trom 24 Canadian and 182 United States universities. We are sure that this broader base tor these titles reported will greatly enhance the value ot this important annual reterence work. While Volume 31 reports theses submitted in 1986, on occasion, certain univer sities do re port theses submitted in previousyears but not reported at the time.

We describe in this book, new methods and applications of hybrid intelligent systems using soft computing techniques. Soft Computing (SC) consists of several intelligent computing paradigms, including fuzzy logic, neural networks, and evolutionary al- rithms, which can be used to produce powerful hybrid intelligent systems. The book is organized in five main parts, which contain a group of papers around a similar

subject. The first part consists of papers with the main theme of intelligent control, which are basically papers that use hybrid systems to solve particular problems of control. The second part contains papers with the main theme of pattern recognition, which are basically papers using soft computing techniques for achieving pattern recognition in different applications. The third part contains papers with the themes of intelligent agents and social systems, which are papers that apply the ideas of agents and social behavior to solve real-world problems. The fourth part contains papers that deal with the hardware implementation of intelligent systems for solving particular problems. The fifth part contains papers that deal with modeling, simulation and optimization for real-world applications.

Build complex embedded systems faster and with lower costs by: * Knowing when and how much simulation testing is appropriate * Applying engineering methods to simulation design and development * Using the best tools available to develop simulations. * Va

A practical methodology for designing integrated automation control for systems and processes Implementing digital control within mechanical-electronic (mechatronic) systems is essential to respond to the growing demand for high-efficiency machines and processes. In practice, the most efficient digital control often integrates time-driven and event-driven characteristics within a single control scheme. However, most of the current engineering literature on the design of digital control systems presents discrete-time systems and discrete-event systems separately. Control Of Mechatronic Systems: Model-Driven Design And Implementation Guidelines unites the two systems, revisiting the concept of automated control by presenting a unique practical methodology for whole-system integration. With its innovative hybrid approach to the modeling, analysis, and design of control systems, this text provides material for mechatronic engineering and process automation courses, as well as for self-study across engineering disciplines. Real-life design problems and automation case studies help readers transfer theory to practice, whether they are building single machines or large-scale industrial systems. Presents a novel approach to the integration of discrete-time and discrete-event systems within mechatronic systems and industrial processes Offers user-friendly self-study units, with worked examples and numerous real-world exercises in each chapter Covers a range of engineering disciplines and applies to small- and large-scale systems, for broad appeal in research and practice Provides a firm theoretical foundation allowing readers to comprehend the underlying technologies of mechatronic systems and processes Control Of Mechatronic Systems is an important text for advanced students and professionals of all levels engaged in a broad range of engineering disciplines.

This book constitutes the proceedings of the 8th International Workshop on Design, Modeling, and Evaluation of Cyber Physical Systems, CyPhy 2018 and 14th International Workshop on Embedded and Cyber-Physical Systems Education, WESE 2018, held in conjunction with ESWeek 2018, in Torino, Italy, in October 2018.The 13 full papers presented together with 1 short paper in this volume were carefully reviewed and selected from 18 submissions. The conference presents a wide range of domains including Modeling, simulation, verification, design, cyber-physical systems, embedded systems, real-time systems, safety, and reliability.

This book thoroughly covers the fundamentals of the QFT robust control, as well as practical control solutions, for unstable, time-delay, non-minimum phase or distributed parameter systems, plants with large model uncertainty, high-performance specifications, nonlinear components, multi-input multi-output characteristics or asymmetric topologies. The reader will discover practical applications through a collection of fifty successful, real world case studies and projects, in which the author has been involved during the last twenty-five years, including commercial wind turbines, wastewater treatment plants, power systems, satellites with flexible appendages, spacecraft, large radio telescopes, and industrial manufacturing systems. Furthermore, the book presents problems and projects with the popular QFT Control Toolbox (QFTCT) for MATLAB, which was developed by the author.

This book presents high-quality, original contributions (both theoretical and experimental) on Information Security, Machine Learning, Data Mining and Internet of Things (IoT). It gathers papers presented at ICETIT 2019, the 1st International Conference on Emerging Trends in Information Technology, which was held in Delhi, India, in June 2019. This conference series represents a targeted response to the growing need for research that reports on and assesses the practical implications of IoT and network technologies, AI and machine learning, data analytics and cloud computing, security and privacy, and next generation computing technologies.

Standalone (off-grid) renewable energy systems supply electricity in places where there is no access to a standard electrical grid. These systems may include photovoltaic generators, wind turbines, hydro turbines or any other renewable electrical generator. Usually, this kind of system includes electricity storage (commonly lead-acid batteries, but also other types of storage can be used). In some cases, a backup generator (usually powered by fossil fuel, diesel or gasoline) is part of the hybrid system. The modelling of the components, the control of the system and the simulation of the performance of the whole system are necessary to evaluate the system technically and economically. The optimization of the sizing and/or the control is also an important task in this kind of system.

This book gathers the carefully reviewed proceedings of the 19th International Conference on Systems Science, presenting recent research findings in the areas of Artificial Intelligence, Machine Learning, Communication/Networking and Information Technology, Control Theory, Decision Support, Image Processing and Computer Vision, Optimization Techniques, Pattern Recognition, Robotics, Service Science, Web-based Services, Uncertain Systems and Transportation Systems. The International Conference on Systems Science was held in Wroclaw, Poland from September 7 to 9, 2016, and addressed a range of topics, including systems theory, control theory, machine learning, artificial intelligence, signal processing, communication and information technologies, transportation systems, multi-robotic systems and uncertain systems, as well as their applications. The aim of the conference is to provide a platform for communication between young and established researchers and practitioners, fostering future joint research in systems science.

This book develops the understanding and skills needed to be able to tackle original control problems. The general approach to a given control problem is to try the simplest tentative solution first and, when this is insufficient, to explain why and use a more sophisticated alternative to remedy the deficiency and achieve satisfactory performance. This pattern of working gives readers a full understanding of different controllers and teaches them to make an informed choice between traditional controllers and more advanced modern alternatives in meeting the needs of a particular plant. Attention is focused on the time domain, covering model-based linear and nonlinear forms of control together with robust control based on sliding modes and the use of state observers such as disturbance estimation. Feedback Control is self-contained, paying much attention to explanations of underlying concepts, with detailed mathematical derivations being employed where necessary. Ample use is made of diagrams to aid these conceptual explanations and the subject matter is enlivened by continual use of examples and problems derived from real control applications. Readers' learning is further enhanced by experimenting with the fully-commented MATLAB®/Simulink® simulation environment made accessible at insert URL here to produce simulations relevant to all of the topics covered in the text. A solutions manual for use by instructors adopting the book can also be downloaded from insert URL here. Feedback Control is suitable as a main textbook for graduate and final-year undergraduate courses containing control modules; knowledge of ordinary linear differential equations, Laplace transforms, transfer functions, poles and zeros, root locus and elementary frequency response analysis, and elementary feedback control is required. It is also a useful reference source on control design methods for engineers practicing in industry and for academic control researchers.

Control systems play an important role in engineering. Fuzzy logic is the natural choice for designing control applications and is the most popular and appropriate for the control of home and industrial appliances. Academic and industrial experts are constantly researching and proposing innovative and effective fuzzy control systems. This book is an edited volume and has 21 innovative chapters arranged into five sections covering applications of fuzzy control systems in energy and power systems, navigation systems, imaging, and industrial engineering. Overall, this book provides a rich set of modern fuzzy control systems and their applications and will be a useful resource for the graduate students, researchers, and practicing engineers in the field of electrical engineering.

Despite two decades of massive strides in research and development on control strategies and their subsequent implementation, most books on permanent magnet motor drives still focus primarily on motor design, providing only elementary coverage of control and converters. Addressing that gap with information that has largely been disseminated only in journals and at conferences, Permanent Magnet Synchronous and Brushless DC Motor Drives is a long-awaited comprehensive overview of power electronic converters for permanent magnet synchronous machines and control strategies for variable-speed operation. It introduces machines, power devices, inverters, and control, and addresses modeling, implementation, control strategies, and flux weakening operations, as well as parameter sensitivity, and rotor position sensorless control. Suitable for both industrial and academic audiences, this book also covers the simulation, low cost inverter topologies, and commutation torque ripple of PM brushless DC motor drives. Simulation of the motor drives system is illustrated with MATLAB® codes in the text. This book is divided into three parts—fundamentals of PM synchronous and brushless dc machines, power devices, inverters; PM synchronous motor drives, and brushless dc motor drives. With regard to the power electronics associated with these drive systems, the author: Explores use of the standard three-phase bridge inverter for driving the machine, power factor correction, and inverter control Introduces space vector modulation step by step and contrasts with PWM Details dead time effects in the inverter, and its compensation Discusses new power converter topologies being considered for low-cost drive systems in PM brushless DC motor drives This reference is dedicated exclusively to PM ac machines, with a timely emphasis on control and standard, and low-cost converter topologies. Widely used for teaching at the doctoral level and for industrial audiences both in the U.S. and abroad, it will be a welcome addition to any engineer’s library.

Carefully separating the essential from the ornamental, Essentials of Control Techniques and Theory presents the nuts and bolts for designing a successful controller. It discusses the theory required to support the art of designing a working controller as well as the various aspects to convince a client, employer, or examiner of your expertise. A Compelling Account of the Basics of Control Theory Control solutions for practicing engineers Using the author’s own Javascript On-Line Learning Interactive Environment for Simulation (Jollies), the text relies on computer-based graphical analysis methods, such as Nyquist, Nichols, root locus, and phase-plane, to illustrate how useful computer simulation can be for analyzing both linear and nonlinear systems. It explains step-by-step the design and modeling of various control systems, including discrete time systems and an inverted pendulum. Along with offering many web-based simulations, the book shows how mathematics, such as vectors, matrices, and the differential equations that govern state variables, can help us understand the concepts that underpin the controller’s effects. From frequency domain analysis to time-domain state-space representation, this book covers many aspects of classical and modern control theory. It presents important methods for designing and analyzing linear systems and controllers.

The topic of dynamic models tends to be splintered across various disciplines, making it difficult to uniformly study the subject. Moreover, the models have a variety of representations, from traditional mathematical notations to diagrammatic and immersive depictions. Collecting all of these expressions of dynamic models, the Handbook of Dynamic System Modeling explores a panoply of different types of modeling methods available for dynamical systems. Featuring an interdisciplinary, balanced approach, the handbook focuses on both generalized dynamic knowledge and specific models. It first introduces the general concepts, representations, and philosophy of dynamic models, followed by a section on modeling methodologies that explains how to portray designed models on a computer. After addressing scale, heterogeneity, and composition issues, the book covers specific model types that are often characterized by specific visual- or text-based grammars. It concludes with case studies that employ two well-known commercial packages to construct, simulate, and analyze dynamic models. A complete guide to the fundamentals, types, and applications of dynamic models, this handbook shows how systems function and are represented over time and space and illustrates how to select a particular model based on a specific area of interest.

This work presents nonlinear control algorithms for a benchmark mechanical system actuated by different types of electric machinery, emphasizing system stability and robustness - pivotal in the development of optimal position trajectory controllers for common motors.;College or university bookstores may order five or more copies at a special studen

This book constitutes the refereed proceedings of the 18th Annual Conference on Towards Autonomous Robotics, TAROS 2017, held in Guildford, UK, in July 2017. The 43 revised full papers presented together with 13 short papers were carefully reviewed and selected from 66 submissions. The papers discuss robotics research drawn from a wide and diverse range of topics, such as swarm and multi-robotic systems; human-robot interaction; robotic learning and imitation; robot navigation, planning and safety; humanoid and bio-inspired robots; mobile robots and vehicles; robot testing and design; detection and recognition; learning and adaptive behaviours; interaction; soft and reconfigurable robots; and service and industrial robots.

Los escáneres láser son dispositivos de escaneo óptico que miden la topografía de la superficie utilizando escaneo láser físico por punto de luz que se mueve a través de una superficie. Un nuevo sistema de visión técnica fue desarrollado en el Instituto de Ingeniería de la UABC, que consiste principalmente en un dispositivo de escaneo láser usando triangulación dinámica para obtener coordenadas 3D de cualquier objeto examinado. En este sentido, el presente libro

describe la sustitución de actuadores discretos por motores DC, para eliminar zonas muertas y realizar un escaneo láser continuo en el campo del sistema de visión técnica.

Modeling and Analysis of Dynamic Systems, Second Edition introduces MATLAB®, Simulink®, and SimscapeTM and then uses them throughout the text to perform symbolic, graphical, numerical, and simulation tasks. Written for junior or senior level courses, the textbook meticulously covers techniques for modeling dynamic systems, methods of response analysis, and provides an introduction to vibration and control systems. These features combine to provide students with a thorough knowledge of the mathematical modeling and analysis of dynamic systems. See What's New in the Second Edition: Coverage of modeling and analysis of dynamic systems ranging from mechanical to thermal using Simscape Utilization of Simulink for linearization as well as simulation of nonlinear dynamic systems Integration of Simscape into Simulink for control system analysis and design Each topic covered includes at least one example, giving students better comprehension of the subject matter. More complex topics are accompanied by multiple, painstakingly worked-out examples. Each section of each chapter is followed by several exercises so that students can immediately apply the ideas just learned. End-of-chapter review exercises help in learning how a combination of different ideas can be used to analyze a problem. This second edition of a bestselling textbook fully integrates the MATLAB Simscape Toolbox and covers the usage of Simulink for new purposes. It gives students better insight into the involvement of actual physical components rather than their mathematical representations.

Identifying Emerging Trends in Technological Innovation Doctoral programs in science and engineering are important sources of innovative ideas and techniques that might lead to new products and technological innovation. Certainly most PhD students are not experienced researchers and are in the process of learning how to do research. Nevertheless, a number of empiric studies also show that a high number of technological innovation ideas are produced in the early careers of researchers. The combination of the eagerness to try new approaches and directions of young doctoral students with the experience and broad knowledge of their supervisors is likely to result in an important pool of innovation potential. The DoCEIS doctoral conference on Computing, Electrical and Industrial En- neering aims at creating a space for sharing and discussing ideas and results from doctoral research in these inter-related areas of engineering. Innovative ideas and hypotheses can be better enhanced when presented and discussed in an encouraging and open environment. DoCEIS aims to provide such an environment, releasing PhD students from the pressure of presenting their propositions in more formal contexts.

Covering fractional order theory, simulation and experiments,this book explains how fractional order modelling and fractionalorder controller design compares favourably with traditionalvelocity and position control systems. The authors systematicallycompare the two approaches using applied fractional calculus.Stability theory in fractional order controllers design is alsoanalysed. Presents material suitable for a variety of real-worldapplications, including hard disk drives, vehicular controls, robotcontrol and micropositioners in DNA microarray analysis Includes extensive experimental results from both lab benchlevel tests and industrial level, mass-production-readyimplementations Covers detailed derivations and numerical simulations for eachcase Discusses feasible design specifications, ideal for practicingengineers The book also covers key topics including: fractional orderdisturbance cancellation and adaptive learning control studies forexternal disturbances; optimization approaches for nonlinear systemcontrol and design schemes with backlash and friction.Illustrations and experimental validations are included for each ofthe proposed control schemes to enable readers to develop a clearunderstanding of the approaches covered, and move on to apply themin real-world scenarios.

Developed from the author's academic and industrial experiences, Modeling and Control of Engineering Systems provides a unified treatment of the modeling of mechanical, electrical, fluid, and thermal systems and then systematically covers conventional, advanced, and intelligent control, instrumentation, experimentation, and design. It includes theory, analytical techniques, popular computer tools, simulation details, and applications. Overcoming the deficiencies of other modeling and control books, this text relates the model to the physical system and addresses why a particular control technique is suitable for controlling the system. Although MATLAB®, Simulink®, and LabVIEWTM are used, the author fully explains the fundamentals and analytical basis behind the methods, the choice of proper tools to analyze a given problem, the ways to interpret and validate the results, and the limitations of the software tools. This approach enables readers to thoroughly grasp the core foundation of the subject and understand how to apply the concepts in practice. Control ensures accurate operation of a system. Proper control of an engineering system requires a basic understanding and a suitable representation (model) of the system. This book builds up expertise in modeling and control so that readers can further their analytical skills in hands-on settings.

The first ICANNGA conference, devoted to biologically inspired computational paradigms, Neural Net works and Genetic Algorithms, was held in Innsbruck, Austria, in 1993. The meeting attracted researchers from all over Europe and further afield, who decided that this particular blend of topics should form a theme for a series of biennial conferences. The second meeting, held in Ales, France, in 1995, carried on the tradition set in Innsbruck of a relaxed and stimulating environment for the. exchange of ideas. The series has continued in Norwich, UK, in 1997, and Portoroz, Slovenia, in 1999. The Institute of Computer Science, Czech Academy of Sciences, is pleased to host the fifth conference in Prague. We have chosen the Liechtenstein palace under the Prague Castle as the conference site to enhance the traditionally good atmosphere of the meeting. There is an inspirational genius loci of the historical center of the city, where four hundred years ago a fruitful combination of theoretical and empirical method, through the collaboration of Johannes Kepler and Tycho de Brahe, led to the discovery of the laws of planetary orbits.

The objective of FUNDAMENTALS OF MECHATRONICS is to cover both hardware and software aspects of mechatronics systems in a single text, giving a complete treatment to the subject matter. The text focuses on application considerations and relevant practical issues that arise in the selection and design of mechatronics components and systems. The text uses several programming languages to illustrate the key topics. Different programming platforms are presented to give instructors the choice to select the programming language most suited to their course objectives. A separate laboratory book, with additional exercises is provided to give guided hands-on experience with many of the topics covered in the text. Important Notice: Media content referenced within the product description or the product text may not be available in the ebook version.

System Dynamics is a cornerstone resource for engineers faced with the evermore-complex job of designing mechatronic systems involving any number of electrical, mechanical, hydraulic, pneumatic, thermal, and magnetic subsystems. This updated Fourth Edition offers the latest coverage on one of the most important design tools today-bond graph modeling-the powerful, unified graphic modeling language. The only comprehensive guide to modeling, designing, simulating, and analyzing dynamic systems comprising a variety of technologies and energy domains, System Dynamics, Fourth Edition continues the previous edition's step-by-step approach to creating dynamic models. (Midwest).

This volume contains 67 papers reporting on the state-of-the-art research in the fields of adaptive control and intelligent tuning. Papers include applications in robotics, the processing industries and machine control.

The book discusses the concept of process automation and mechatronic system design, while offering a unified approach and methodology for the modeling, analysis, automation and control, networking, monitoring, and sensing of various machines and processes from single electrical-driven machines to large-scale industrial process operations. This step-by-step guide covers design applications from various engineering disciplines (mechanical, chemical, electrical, computer, biomedical) through real-life mechatronics problems and industrial automation case studies with topics such as manufacturing, power grid, cement production, wind generator, oil refining, incubator, etc. Provides step-by-step procedures for the modeling, analysis, control and automation,

networking, monitoring, and sensing of single electrical-driven machines to large-scale industrial process operations. Presents model-based theory and practice guidelines for mechatronics system and process automation design. Includes worked examples in every chapter and numerous end-of-chapter real-life exercises, problems, and case studies.

In recent years, linear motor has gained popularity as linear motion drive in industry and factory automation which provides an alternative to conventional rotary motor. This development was encouraged by the advantages offered by linear motors such as flexibility in size and design, clean and silent operation, ease of maintenance and deliver high performance for applications requiring linear motion. However, the main constraint for system designers to consider linear motors in their application is the cost for every complete package of linear motor. Generally, linear motors are expensive than their counterparts due to the number of permanent magnet used in the motors and the sensory technologies used for positioning system. Linear motors provide direct linear motion and normally are designed with specific length which requires more permanent magnets than rotary motor. Therefore, the costs of linear motors increase with the length of the motor itself. For a typical linear motor driver, a positioning sensor, usually attached to the motor, provides feedback positioning signal to the controller. This sensor is expensive and normally has the same length with the motor. The price for this type of sensor increases with the size, which eventually increase the cost of linear motors. For some applications, where positioning is not too critical such as robot end gripper, the high precision and expensive positioning sensor is not necessary. Removing this sensor from the system reduces the overall system cost, thus encouraging more development and application of linear motors. This research and study proposes a sensorless positioning system for linear DC motor (LDM). The ideas to control the position of the LDM are by controlling the current supplied to the motor. The technique used to control the current is by manipulating Pulse Width Modulation (PWM) signal which is generated by a microcontroller circuit based on Atmel AVR ATmega8535 processor. A simple model of LDM was constructed for experimental purposes. A mechanical spring was used in the motor design to absorb the force produced by the motor. The displacement of the spring will then be used to determine the position of the motor. Due to the harmonic oscillation produced in mass-spring system, the position of the motor oscillates before reaching the final desired position. In order to eliminate the harmonic oscillation effect, a few variants pattern of PWM signals are used to drive the motor. These variant patterns are single stage, dual stage, triple stage and quadruple stage. The variant patterns of PWM signals were created by combining multiple values of duty cycle running in a single PWM signal. A mathematical model for constructed LDM has been derived based on damped force oscillation of mass spring system theory. The equation of motion for LDM is then simulated using Matlab software. The time response of the system based on simulation results has been studied and proper adjustment to control parameters has been made to improve the rise time, overshoot percentage and steady state error. The adjusted driving parameters are then transferred to microcontroller unit for actual laboratory experiment. The objective of this research to develop a sensorless positioning system for LDM which include a motor driver and control approach was successfully achieved. Comparison between simulation results and laboratory experiment shows almost identical results. Linear relation between motor position and timing parameters used in control algorithms has been studied and linear equations have been derived. These linear equations will be converted into microprocessor programming as feed-forward control algorithms. Any desired motor position can be fed into the system and microprocessor unit will generates a proper PWM driving signal to the motor. The developed system can be used for any low cost applications which do not require precise positioning.

This book is a printed edition of the Special Issue "Raspberry Pi Technology" that was published in Electronics

This thesis attempts to tune any controller without the mathematical model knowledge of the system it is controlling. For that purpose, the optimization algorithm of MATLAB® 6.5 / Nonlinear Control Design Blockset (NCD) is adapted for real-time executions and combined with a hardware-in-the-loop simulation provided by MATLAB® 6.5 / Real-Time Windows Target (RTWT). A noise-included model of a DC motor position control system is obtained in MATLAB® / SIMULINK first and simulated to test the modified algorithm in some aspects. Then the presented methodology is verified using the physical plant (DC motor position control system) where tuning algorithm is driven mainly by the real system data and the required performance parameters specified by a user defined constraint window are successfully satisfied. Resultant improvements on the step response behavior of DC motor position control system are shown for two case studies.

The extraordinary development of digital computers (microprocessors, microcontrollers) and their extensive use in control systems in all fields of applications has brought about important changes in the design of control systems. Their performance and their low cost make them suitable for use in control systems of various kinds which demand far better capabilities and performances than those provided by analog controllers. However, in order really to take advantage of the capabilities of microprocessors, it is not enough to reproduce the behavior of analog (PID) controllers. One needs to implement specific and high-performance model based control techniques developed for computer-controlled systems (techniques that have been extensively tested in practice). In this context identification of a plant dynamic model from data is a fundamental step in the design of the control system. The book takes into account the fact that the association of books with software and on-line material is radically changing the teaching methods of the control discipline. Despite its interactive character, computer-aided control design software requires the understanding of a number of concepts in order to be used efficiently. The use of software for illustrating the various concepts and algorithms helps understanding and rapidly gives a feeling of the various phenomena.