

Speed Control Of Fuzzy Based Power Factor Correction Cuk

The automatic control has played a vital role in the advance of engineering and science. Nowadays in industries, the control of direct current (DC) motor is a common practice thus the implementation of DC motor of controller speed is important. The main purpose of motor speed control is to keep the rotation of the motor at the present speed and to drive a system at the demand speed. The DC Series Wound Motor is very popular in industrial application and control systems because of the high torque density, high efficiency and small size. The main purpose of this project is to control speed of DC Series Wound Motor using four controllers which are PID, PI, P, and Fuzzy Logic Controller (FLC). Initially all the controllers are developed by using MATLAB simulink model. In this project, PID, PI, and P controller are developed and tuned in order to get faster step response and the Fuzzy Logic Controller (FLC) is design based on the membership function and the rule base. The expectation of this project is the Fuzzy Logic Controller will get the best performance compared to other controllers in terms of settling time (T_s), rise time (T_r), peak time (T_p), and percent overshoot (%OS). Finally a GUI of these controllers are developed which allow the users to select any controller and change its parameters

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according to the different conditions under loaded and unloaded scenarios.

In this book, highly qualified scientists present their recent research motivated by the importance of electric machines. It addresses advanced studies for high-speed electrical machine design, mechanical design of rotors with surface-mounted permanent magnets, design of motor drive for brushless DC motor, single-phase motors for household applications, battery electric propulsion systems for competition racing applications, robust diagnosis by observer using the bond graph approach, a DC motor simulator based on virtual instrumentation, start-up of a PID fuzzy logic embedded control system for the speed of a DC motor using LabVIEW, advanced control of the permanent magnet synchronous motor and optimization of fuzzy logic controllers by particle swarm optimization to increase the lifetime in power electronic stages.

*Introduces cutting-edge control systems to a wide readership of engineers and students *The first book on neuro-fuzzy control systems to take a practical, applications-based approach, backed up with worked examples and case studies *Learn to use VHDL in real-world applications Introducing cutting edge control systems through real-world applications Neural networks and fuzzy logic based systems offer a modern control solution to AC machines used in variable speed drives, enabling industry to save

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costs and increase efficiency by replacing expensive and high-maintenance DC motor systems. The use of fast micros has revolutionised the field with sensorless vector control and direct torque control. This book reflects recent research findings and acts as a useful guide to the new generation of control systems for a wide readership of advanced undergraduate and graduate students, as well as practising engineers. The authors guide readers quickly and concisely through the complex topics of neural networks, fuzzy logic, mathematical modelling of electrical machines, power systems control and VHDL design. Unlike the academic monographs that have previously been published on each of these subjects, this book combines them and is based round case studies of systems analysis, control strategies, design, simulation and implementation. The result is a guide to applied control systems design that will appeal equally to students and professional design engineers. The book can also be used as a unique VHDL design aid, based on real-world power engineering applications.

This book consists of selected papers written by the founder of fuzzy set theory, Lotfi A Zadeh. Since Zadeh is not only the founder of this field, but has also been the principal contributor to its development over the last 30 years, the papers contain virtually all the major ideas in fuzzy set theory, fuzzy logic, and fuzzy systems in their historical context. Many of the

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ideas presented in the papers are still open to further development. The book is thus an important resource for anyone interested in the areas of fuzzy set theory, fuzzy logic, and fuzzy systems, as well as their applications. Moreover, the book is also intended to play a useful role in higher education, as a rich source of supplementary reading in relevant courses and seminars. The book contains a bibliography of all papers published by Zadeh in the period 1949-1995. It also contains an introduction that traces the development of Zadeh's ideas pertaining to fuzzy sets, fuzzy logic, and fuzzy systems via his papers. The ideas range from his 1965 seminal idea of the concept of a fuzzy set to ideas reflecting his current interest in computing with words ? a computing in which linguistic expressions are used in place of numbers. Places in the papers, where each idea is presented can easily be found by the reader via the Subject Index.

There are a myriad of mathematical problems that cannot be solved using traditional methods. The development of fuzzy expert systems has provided new opportunities for problem-solving amidst uncertainties. Fuzzy Systems: Concepts, Methodologies, Tools, and Applications is a comprehensive reference source on the latest scholarly research and developments in fuzzy rule-based methods and examines both theoretical foundations and real-world utilization of these logic

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sets. Featuring a range of extensive coverage across innovative topics, such as fuzzy logic, rule-based systems, and fuzzy analysis, this is an essential publication for scientists, doctors, engineers, physicians, and researchers interested in emerging perspectives and uses of fuzzy systems in various sectors.

This book addresses some of the challenges suffered by the well-known and robust sliding-mode control paradigm. The authors show how the fusion of fuzzy systems with sliding-mode controllers can alleviate some of these problems and promote applicability. Fuzzy systems used as soft switches eliminate high-frequency signal oscillations and can substantially lower the noise sensitivity of sliding-mode controllers. The amount of a priori knowledge required concerning the nominal structure and parameters of a nonlinear system is also shown to be much reduced by exploiting the general function-approximation property of fuzzy systems so as to use them as identifiers. The main features of this book include: " a review of various existing structures of sliding-mode fuzzy control; " a guide to the fundamental mathematics of sliding-mode fuzzy controllers and their stability analysis; " state-of-the-art procedures for the design of a sliding-mode fuzzy controller; " source codes including MATLAB® and Simulink® codes illustrating the simulation of these controllers, particularly the adaptive controllers; " a

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short bibliography for each chapter for readers interested in learning more on a particular subject; and " illustrative examples and simulation results to support the main claims made in the text. Academic researchers and graduate students interested in the control of nonlinear systems and particularly those working in sliding-mode controller design will find this book a valuable source of comparative information on existing controllers and ideas for the development of new ones.

This book offers a collection of high-quality peer-reviewed research papers presented at the Second International Conference on Communication and Computational Technologies (ICCCT 2019), held at Rajasthan Institute of Engineering and Technology, Jaipur, Rajasthan, India, on 30–31 August 2019. In contributions prepared by researchers from academia and industry alike, the book discusses a wide variety of industrial, engineering and scientific applications of emerging techniques.

This proceedings put together 68 selected articles from the joint conferences of 2014 Congress on Industrial Engineering, Machine Design and Automation (IEMDA2014) and the 2nd Congress on Computer Science and Application (CCSA2014), held in Sanya, China during December 12 - 14, 2014. The conference program of IEMDA 2014 focused on areas of Industrial Engineering, Machine Design and Automation, while the CCSA 2014

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program provided the platform for Computer Science and Applications. Collected together the latest research results and applications on industrial engineering, machine design, automation, and computer science and other related Engineering topics. All submitted papers to this proceedings were subjected to strict peer-reviewing by 2-4 expert referees, to ensure that all articles selected are of highest standard and are relevance to the conference.

This dissertation presents a methodology for implementation of a rule based fuzzy logic controller applied to a closed loop volts/hertz single phase induction motor speed control. The induction motor is modelled by using d-q axis theory. The performance of FLC is compared with that of a PI controller. The advantages of the Fuzzy Logic Controller over the conventional controllers are : (i) they are economically advantageous to develop, (ii) a wider range of operating conditions can be covered using FLCs, and initial approximate set of fuzzy rules can be impulsively refined by a self-organizing fuzzy controller. For volts/hertz speed control of the single phase induction motor, a reference speed has been used and the control architecture includes some rules. The errors are evaluated according to the rules in accordance to the defined member functions. The member functions and the rules have been defined using the Fuzzy

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Inference System (FIS) editor given in Matlab. The system has been simulated in Matlab / Simulink and the results are given. Provide briefing results, analysis and discussed.

Fuzzy logic techniques have had extraordinary growth in various engineering systems. The developments in engineering sciences have caused apprehension in modern years due to high-tech industrial processes with ever-increasing levels of complexity. Advanced Fuzzy Logic Approaches in Engineering Science provides innovative insights into a comprehensive range of soft fuzzy logic techniques applied in various fields of engineering problems like fuzzy sets theory, adaptive neuro fuzzy inference system, and hybrid fuzzy logic genetic algorithms belief networks in industrial and engineering settings. The content within this publication represents the work of particle swarms, fuzzy computing, and rough sets. It is a vital reference source for engineers, research scientists, academicians, and graduate-level students seeking coverage on topics centered on the applications of fuzzy logic in high-tech industrial processes.

This new resource is a practical overview of designing, testing and troubleshooting power electronics in alternative energy systems, providing you with the most important information on how power electronics components such as inverters, controllers and batteries can play a pivotal role in the

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successful implementation of green energy solutions for both stand-alone and grid-connected applications. You will learn how to choose the right components for diverse systems, from utility-scale wind farms to photovoltaic panels on single residences, how to get the most out of existing systems, and how to solve the tough challenges particular to alternative energy applications. Whether you are a renewables professional who needs to understand more about how power electronics impact energy output, or a power engineer who is interested in learning what new avenues the alternative energy revolution is opening for your work, start here with advice and explanations from the experts, including equations, diagrams and tables designed to help you understand and succeed. Provides a thorough overview of the key technologies, methods and challenges for implementing power electronics in alternative energy systems for optimal power generation Includes hard-to-find information on how to apply converters, inverters, batteries, controllers and more for stand-alone and grid-connected systems Covers wind and solar applications, as well as ocean and geothermal energy, hybrid systems and fuel cells

This book comprises a selection of papers on new methods for analysis and design of hybrid intelligent systems using soft computing techniques from the IFSA 2007 World Congress, held in Cancun, Mexico,

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June 2007.

This book aims to examine innovation in the fields of computer engineering and networking. The book covers important emerging topics in computer engineering and networking, and it will help researchers and engineers improve their knowledge of state-of-art in related areas. The book presents papers from the 4th International Conference on Computer Engineering and Networks (CENet2014) held July 19-20, 2014 in Shanghai, China.

This book presents the proceedings of the 6th International Conference on Advanced Intelligent Systems and Informatics 2020 (AISII2020), which took place in Cairo, Egypt, from October 19 to 21, 2020. This international and interdisciplinary conference, which highlighted essential research and developments in the fields of informatics and intelligent systems, was organized by the Scientific Research Group in Egypt (SRGE). The book is divided into several sections, covering the following topics: Intelligent Systems, Deep Learning Technology, Document and Sentiment Analysis, Blockchain and Cyber Physical System, Health Informatics and AI against COVID-19, Data Mining, Power and Control Systems, Business Intelligence, Social Media and Digital Transformation, Robotic, Control Design, and Smart Systems.

This book collects high-quality research papers presented at the International Conference on

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Computing Applications in Electrical & Electronics Engineering, held at Rajkiya Engineering College, Sonbhadra, India, on August 30–31, 2019. It provides novel contributions in computational intelligence, together with valuable reference material for future research. The topics covered include: big data analytics, IoT and smart infrastructures, machine learning, artificial intelligence and deep learning, crowd sourcing and social intelligence, natural language processing, business intelligence, high-performance computing, wireless, mobile and green communications, ad-hoc, sensor and mesh networks, SDN and network virtualization, cognitive systems, swarm intelligence, human–computer interaction, network and information security, intelligent control, soft computing, networked control systems, renewable energy sources and technologies, biomedical signal processing, pattern recognition and object tracking, and sensor devices and applications.

Model Based Fuzzy Control uses a given conventional or fuzzy open loop model of the plant under control to derive the set of fuzzy rules for the fuzzy controller. Of central interest are the stability, performance, and robustness of the resulting closed loop system. The major objective of model based fuzzy control is to use the full range of linear and nonlinear design and analysis methods to design such fuzzy controllers with better stability,

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performance, and robustness properties than non-fuzzy controllers designed using the same techniques. This objective has already been achieved for fuzzy sliding mode controllers and fuzzy gain schedulers - the main topics of this book. The primary aim of the book is to serve as a guide for the practitioner and to provide introductory material for courses in control theory.

Academic Paper from the year 2020 in the subject Computer Science - Miscellaneous, , language: English, abstract: The main target of this paper is to control the speed of DC motor by comparing the actual and the desired speed set point. The DC motor is designed using Fuzzy logic and MPC controllers. The comparison is made between the proposed controllers for the control target speed of the DC motor using square and white noise desired input signals with the help of Matlab/Simulink software. It has been realized that the design based on the fuzzy logic controller track the set point with the best steady state and transient system behavior than the design with MPC controller. Finally, the comparative simulation result prove the effectiveness of the DC motor with fuzzy logic controller.

Speed Control of DC Motor by Using Fuzzy Logic Controller

Algorithms Information Systems Machine Learning
Artificial Intelligence Expert Systems Computer

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Vision Pattern Recognition Human Computer Interaction Natural Language Processing Bioinformatics Software Engineering Database Data Mining Big Data Distributed, Mobile and Cloud Computing Signal Processing Image Processing Computer Graphics Audio, Video and Multimedia Processing Computer Networks Data Communication Network and System Security Internet of Things Computer Architecture Robotics Control Systems Embedded Systems VLSI Design and Fabrication Mobile and Wireless Communication

This book presents the select proceedings of the International Conference on Automation, Signal Processing, Instrumentation and Control (i-CASIC) 2020. The book mainly focuses on emerging technologies in electrical systems, IoT-based instrumentation, advanced industrial automation, and advanced image and signal processing. It also includes studies on the analysis, design and implementation of instrumentation systems, and high-accuracy and energy-efficient controllers. The contents of this book will be useful for beginners, researchers as well as professionals interested in instrumentation and control, and other allied fields. This book is the proceedings of the Third International Conference on Fuzzy Information and Engineering (ICFIE 2009) held in the famous mountain city Chongqing in Southwestern China, from September 26-29, 2009. Only high-quality

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papers are included. The ICFIE 2009, built on the success of previous conferences, the ICFIE 2007 (Guangzhou, China), is a major symposium for scientists, engineers and practitioners in the world to present their updated results, ideas, developments and applications in all areas of fuzzy information and engineering. It aims to strengthen relations between industry research laboratories and universities, and to create a primary symposium for world scientists in fuzzy fields as follows: Fuzzy Information; Fuzzy Sets and Systems; Soft Computing; Fuzzy Engineering; Fuzzy Operation Research and Management; Artificial Intelligence; Fuzzy Mathematics and Systems in Applications, etc.

The book is a collection of high-quality peer-reviewed research papers presented in International Conference on Soft Computing Systems (ICSCS 2015) held at Noorul Islam Centre for Higher Education, Chennai, India. These research papers provide the latest developments in the emerging areas of Soft Computing in Engineering and Technology. The book is organized in two volumes and discusses a wide variety of industrial, engineering and scientific applications of the emerging techniques. It presents invited papers from the inventors/originators of new applications and advanced technologies.

Introduction; Fuzzy control: the basics; Case studies in design and implementation; nonlinear analysis;

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Fuzzy identification and estimation; Adaptive fuzzy control; Fuzzy supervisory control; Perspectives on fuzzy control.

Proceedings of the 2012 International Conference on Information Technology and Software Engineering presents selected articles from this major event, which was held in Beijing, December 8-10, 2012.

This book presents the latest research trends, methods and experimental results in the fields of information technology and software engineering, covering various state-of-the-art research theories and approaches. The subjects range from intelligent computing to information processing, software engineering, Web, unified modeling language (UML), multimedia, communication technologies, system identification, graphics and visualizing, etc. The proceedings provide a major interdisciplinary forum for researchers and engineers to present the most innovative studies and advances, which can serve as an excellent reference work for researchers and graduate students working on information technology and software engineering. Prof. Wei Lu, Dr.

Guoqiang Cai, Prof. Weibin Liu and Dr. Weiwei Xing all work at Beijing Jiaotong University.

Electric vehicles/hybrid electric vehicles (EV/HEV) commercialization is still a challenge in industries in terms of performance and cost. The performance along with cost reduction are two tradeoffs which need to be researched to arrive at an optimal solution. This book

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focuses on the convergence of various technologies involved in EV/HEV. The book brings together the research that is being carried out in the field of EV/HEV whose leading role is by optimization techniques with artificial intelligence (AI). Other featured research includes green drive schemes which involve the possible renewable energy sources integration to develop eco-friendly green vehicles, as well as Internet of Things (IoT)-based techniques for EV/HEVs. Electric vehicle research involves multi-disciplinary expertise from electrical, electronics, mechanical engineering and computer science. Consequently, this book serves as a point of convergence wherein all these domains are addressed and merged and will serve as a potential resource for industrialists and researchers working in the domain of electric vehicles.

The Department of Electronics and Communication Engineering of KIET Group of Institutions, Delhi-NCR organized the 4th International Conference ICCE-2020 during November 28-29, 2020. Information compiled in this book is based on the 114 research papers of excellent quality covering different domains of Electronics and Communication Engineering, Computer Science Engineering, Information Technology, Electrical Engineering, Electronics and Instrumentation Engineering. The subject areas treated in the book are: Satellite, Radar and Microwave Techniques, Secure, Smart, and Reliable Networks, Next Generation Networks, Devices & Circuits, Signal & Image Processing, New Emerging Technologies, having the central focus on Recent Trends in Communication &

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Electronics (ICCE-2020). In addition, a few themes based on Special Sessions have also been conducted in ICCE-2020. The objective of the book resulting from the 4th International Conference on Recent Trends in Communication & Electronics (ICCE-2020) is to provide a resource for the study and research work for an interested audience comprising of researchers, students, audience, and practitioners in the areas of Communications & Computing Systems.

This book is an overview of the different paths automation and control engineering have taken lately, from a modern point of view. Built up with example chapters, this book provides some insight into the use of artificial intelligence and control theory on manufacturing, comfort analysis, reliability of modern digital systems, and the use of unusual reference and feedback signals as those coming from the brain. Nonetheless, some chapters are also devoted to a more traditional point of view of control theory, addressing complex problems where human intervention must be limited. Overall, this book is an effort to show that modern automation and control engineering are comprised by many diverse areas, which should interact in order to provide a complete result. In this way, as the systems become more complex and the control objectives more subjective, both, formal analytic and intelligent approaches, should be seen as complementary tools, not unrelated competitors. This books aim is precisely that of showing how broad and diverse the control objectives have become and how the abilities of the control engineer should be extended.

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The book covers different aspects of real-world applications of optimization algorithms. It provides insights from the Fourth International Conference on Harmony Search, Soft Computing and Applications held at BML Munjal University, Gurgaon, India on February 7–9, 2018. It consists of research articles on novel and newly proposed optimization algorithms; the theoretical study of nature-inspired optimization algorithms; numerically established results of nature-inspired optimization algorithms; and real-world applications of optimization algorithms and synthetic benchmarking of optimization algorithms.

Collecting and processing data is a necessary aspect of living in a technologically advanced society. Whether it's monitoring events, controlling different variables, or using decision-making applications, it is important to have a system that is both inexpensive and capable of coping with high amounts of data. As the application of these networks becomes more common, it becomes imperative to evaluate their effectiveness as well as other opportunities for possible implementation in the future. *Sensor Technology: Concepts, Methodologies, Tools, and Applications* is a vital reference source that brings together new ways to process and monitor data and to put it to work in everything from intelligent transportation systems to healthcare to multimedia applications. It also provides inclusive coverage on the processing and applications of wireless communication, sensor networks, and mobile computing. Highlighting a range of topics such as internet of things, signal processing hardware, and wireless sensor technologies, this multi-

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volume book is ideally designed for research and development engineers, IT specialists, developers, graduate students, academics, and researchers. Fuzzy controllers are a class of knowledge based controllers using artificial intelligence techniques with origins in fuzzy logic. They can be found either as stand-alone control elements or as integral parts of a wide range of industrial process control systems and consumer products. Applications of fuzzy controllers are an established practice for Japanese manufacturers, and are spreading in Europe and America. The main aim of this book is to show that fuzzy control is not totally ad hoc, that there exist formal techniques for the analysis of a fuzzy controller, and that fuzzy control can be implemented even when no expert knowledge is available. The book is mainly oriented to control engineers and theorists, although parts can be read without any knowledge of control theory and may interest AI people. This 2nd, revised edition incorporates suggestions from numerous reviewers and updates and reorganizes some of the material.

With the rapid development of Machinery, Materials Science and Engineering Application, discussion on new ideas related mechanical engineering and materials science arise. In this proceedings volume the author(s) are focussed on Machinery, Materials Science and Engineering Applications and other related topics. The Conference has pro

AC motors play a major role in modern industrial applications. Squirrel-cage induction motors (SCIMs) are probably the most frequently used when compared to

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other AC motors because of their low cost, ruggedness, and low maintenance. The material presented in this book is organized into four sections, covering the applications and structural properties of induction motors (IMs), fault detection and diagnostics, control strategies, and the more recently developed topology based on the multiphase (more than three phases) induction motors. This material should be of specific interest to engineers and researchers who are engaged in the modeling, design, and implementation of control algorithms applied to induction motors and, more generally, to readers broadly interested in nonlinear control, health condition monitoring, and fault diagnosis.

The proceedings of SocProS 2013 serve as an academic bonanza for scientists and researchers working in the field of Soft Computing. This book contains theoretical as well as practical aspects of Soft Computing, an umbrella term for techniques like fuzzy logic, neural networks and evolutionary algorithms, swarm intelligence algorithms etc. This book will be beneficial for the young as well as experienced researchers dealing with complex and intricate real world problems for which finding a solution by traditional methods is very difficult. The different areas covered in the proceedings are: Image Processing, Cryptanalysis, Supply Chain Management, Newly Proposed Nature Inspired Algorithms, Optimization, Problems related to Medical and Health Care, Networking etc. This book showcases new theoretical findings and

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techniques in the field of intelligent systems and control. It presents in-depth studies on a number of major topics, including: Multi-Agent Systems, Complex Networks, Intelligent Robots, Complex System Theory and Swarm Behavior, Event-Triggered Control and Data-Driven Control, Robust and Adaptive Control, Big Data and Brain Science, Process Control, Intelligent Sensor and Detection Technology, Deep learning and Learning Control, Guidance, Navigation and Control of Aerial Vehicles, and so on. Given its scope, the book will benefit all researchers, engineers, and graduate students who want to learn about cutting-edge advances in intelligent systems, intelligent control, and artificial intelligence.

This book comprises select proceedings of the international conference ETAEERE 2020, and primarily focuses on renewable energy resources and smart grid technologies. The book provides valuable information on the technology and design of power grid integration on microgrids of green energy sources. Some of the topics covered include solar PV array, hybrid microgrid, daylight harvesting, green computing, photovoltaic applications, nanogrid applications, AC/DC/AC converter for wind energy systems, solar photovoltaic panels, PEM fuel cell system, and biogas run dual-fueled diesel engine. The contents of this book will be useful for researchers and practitioners working in the areas of

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smart grids and renewable energy generation, distribution, and management.

Fuzzy c-means (FCM) Clustering has been used to partition the input-output data and to determine the number of rules. By assuming Gaussian membership function for the premise parts, hybrid learning algorithm is used to update its parameters. This book presents a research work towards the development of a T-S fuzzy model for the speed control of dc motors. To be specific, an attempt is made to design a clustering based fuzzy logic controller for speed control of dc motors. The proposed approach provides a mechanism to obtain the reduced rule-set covering the whole input/output space as well as the parameters of membership functions for each input variable. The entire system has been modeled using MATLAB 7.0/Simulink toolbox.

Conventional controllers like the proportional integral differential (PID) would have being very effective not just for speed control alone, if not for some complexities with individually controlling its respective controllers and summing up their individual contributions to effectively yield controlled signal output. Also, for its insensitivity to changes made to model parameters which may be as a result of misrepresentation of some control variables. As a result of this, developing an intelligent based fuzzy logic controller (FLC) became eminent, and on this

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basis, this book is written. By varying the motor speed with input reference speed, an error signal and a feedback loop is generated. The FLC then operates on the principles of mapping with corrective measure of the error signal generated and it is regulated by sets of IF-THEN rules integrating the Mamdani fuzzy inference approach. The rules projected and formed are used to overcome the drawbacks of conventional controllers. Since induction motors are widely used in many industries today, most especially squirrel caged, an intelligent approach to the control of these motors will save cost, increase reliability and efficiency

The book provides insights of International Conference in Communication, Devices and Networking (ICCDN 2017) organized by the Department of Electronics and Communication Engineering, Sikkim Manipal Institute of Technology, Sikkim, India during 3 – 4 June, 2017. The book discusses latest research papers presented by researchers, engineers, academicians and industry professionals. It also assists both novice and experienced scientists and developers, to explore newer scopes, collect new ideas and establish new cooperation between research groups and exchange ideas, information, techniques and applications in the field of electronics, communication, devices and networking.

Fuzzy Algorithms for Control gives an overview of

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the research results of a number of European research groups that are active and play a leading role in the field of fuzzy modeling and control. It contains 12 chapters divided into three parts. Chapters in the first part address the position of fuzzy systems in control engineering and in the AI community. State-of-the-art surveys on fuzzy modeling and control are presented along with a critical assessment of the role of these methodologists in control engineering. The second part is concerned with several analysis and design issues in fuzzy control systems. The analytical issues addressed include the algebraic representation of fuzzy models of different types, their approximation properties, and stability analysis of fuzzy control systems. Several design aspects are addressed, including performance specification for control systems in a fuzzy decision-making framework and complexity reduction in multivariable fuzzy systems. In the third part of the book, a number of applications of fuzzy control are presented. It is shown that fuzzy control in combination with other techniques such as fuzzy data analysis is an effective approach to the control of modern processes which present many challenges for the design of control systems. One has to cope with problems such as process nonlinearity, time-varying characteristics for incomplete process knowledge. Examples of real-

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world industrial applications presented in this book are a blast furnace, a lime kiln and a solar plant. Other examples of challenging problems in which fuzzy logic plays an important role and which are included in this book are mobile robotics and aircraft control. The aim of this book is to address both theoretical and practical subjects in a balanced way. It will therefore be useful for readers from the academic world and also from industry who want to apply fuzzy control in practice.

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