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Speed Control of Buck-converter Driven DC Motor Using PD-type Fuzzy Logic Controller
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Simulation of Speed Control Brushless DC Motor Using Gaussian Fuzzy Logic Controller
Clustering Based Fuzzy Controller for Speed Control of DC Motor
Application of Fuzzy Logic in the Speed Control of Induction Motor Vector Drive
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Speed Control of Buck-converter Driven DC Motor Using PD-type Fuzzy Logic Controller John Wiley & Sons
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 (Ts), rise time (Tr), peak time (Tp), and percent overshoot (%OS). Finally a GUI of these controllers are developed which allow the users to select any controller and change its parameters according to the different conditions under loaded and unloaded scenarios.
Sensor Technology: Concepts, Methodologies, Tools, and Applications Springer Nature
This book introduces a dynamic, on-line fuzzy inference system. In this system membership functions and control rules are not determined until the system is applied and each output of its lookup table is calculated based on current inputs. The book describes the real-world uses of new fuzzy techniques to simplify readers' tuning processes and enhance the performance of their control systems. It further contains application examples.

Dc Motor Speed Control Using Fuzzy Logic Controller (sofeware) IGI Global
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.
Microcontroller-based Fuzzy Logic Speed Controller for Three-phase Induction Motor GRIN Verlag
Three-phase induction motors have been used in a wide range of industry applications; since they are robust, brushless and have simple design. Furthermore, the speed of induction motor can be easily controlled by variable frequency drives. The continuous development in power electronics semiconductors came out with modern electric drives. These drives use high speed power transistors, like IGBT and MOSFET, with various switching techniques. The speed control of induction motor is important to achieve maximum torque and efficiency. In the past decades, conventional control systems, such as proportional-integral derivative (PID) controller, were applied to electric drives to control the speed of induction motor. The PID controller is not a well established control method in motor drive because of the nonlinearity of induction motor. On the other hand, the use of Fuzzy Logic Controller (FLC) improves the performance of the speed control of induction motor. In this research, a microcontroller-based fuzzy logic controller was developed. The FLC replaces the conventional PI controller to improve the speed response of the drive in order to keep the speed of the induction motor constant when the load varies within the operating range. The research also included the design and implementation of a three-phase voltage source inverter (VSI) driven by Space Vector Pulse Width Modulation (SVPWM) signal. The control system in this research was designed using Matlab/Simulink environment. The simulation included a comparison of speed response of FLC and PI controller. The input to FLC is the linguistic variable of speed error and change of speed error, while the output of FLC is the frequency fed to the inverter. The three-phase inverter was fabricated using MOSFET Hex-bridge connected to a low-pass LC-filter to smooth the inverter output voltage wave. In order to apply FLC and generate corresponding SVPWM signals a PIC16F877A microcontroller was used in the control system. The speed controller was tested using various values of input speed using simulation and experiments. The results showed the superiority of the proposed FLC over the conventional PI controller in the dynamics response of speed. The results also showed the ability of the proposed to generate a three-phase sine wave with desired frequency to control the speed of the induction motor with THD less than 5%.
Fuzzy Control and Identification Springer Nature
Speed Control of DC Motor by Using Fuzzy Logic Controller
Fuzzy Logic Based Speed Control of Three-Phase Induction Motor Drive Springer Science & Business Media
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.
Computing Algorithms with Applications in Engineering Prentice Hall
This open access book bridges the gap between playing with robots in school and studying robotics at the upper undergraduate and graduate levels to prepare for careers in industry and research. Robotic algorithms are presented formally, but using only mathematics known by high-school and first-year college students, such as calculus, matrices and probability. Concepts and algorithms are explained through detailed diagrams and calculations. Elements of Robotics presents an overview of different types of robots and the components used to build robots, but focuses on robotic algorithms: simple algorithms like odometry and feedback control, as well as algorithms for advanced topics like localization, mapping, image processing, machine learning and swarm robotics. These algorithms are demonstrated in simplified contexts that enable detailed computations to be performed and feasible activities to be posed. Students who study these simplified demonstrations will be well prepared for advanced study of robotics. The algorithms are presented at a relatively abstract level, not tied to any specific robot. Instead a generic robot is defined that uses elements common to most educational robots: differential drive with two motors, proximity sensors and some method of displaying output to the user. The theory is supplemented with over 100 activities, most of which can be successfully implemented using inexpensive educational robots. Activities that require more computation can be programmed on a computer. Archives are available with suggested implementations for the Thymio robot and standalone programs in Python.
Simulation of Speed Control Brushless DC Motor Using Gaussian Fuzzy Logic Controller Springer Nature
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.
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*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 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.

Clustering Based Fuzzy Controller for Speed Control of DC Motor World Scientific

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.

Application of Fuzzy Logic in the Speed Control of Induction Motor Vector Drive Springer Nature

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.

Comparison of DC Motor Speed Control Performance using Fuzzy Logic and Model Predictive Control Method Springer

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 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.

18-19 October 2019, Department of Electrical & Electronics Engineering, G.L. Bajaj Institute of Technology and Management, Greater Noida, India Speed Control of DC Motor by Using Fuzzy Logic ControllerThe 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 (Ts), rise time (Tr), peak time (Tp), and percent overshoot (%OS). Finally a GUI of these controllers are developed which allow the users to select any controller and change its parameters according to the different conditions under loaded and unloaded scenarios.Fuzzy Logic Based Speed Control of Three-Phase Induction Motor Drive

This book gives an introduction to basic fuzzy logic and Mamdaniand Takagi-Sugeno fuzzy systems. The text shows howthese can be used to control complex nonlinear engineering systems,while also also suggesting several approaches to modelingof complex engineering systems with unknown models. Finally, fuzzy modeling and control methods are combined in thebook, to create adaptive fuzzy controllers, ending withan example of an obstacle-avoidance controller for an autonomousvehicle using modus ponendo tollens logic.

CENet2014 Springer

This paper presents the design and simulation of a high-performance brain emotional learning and fuzzy-based intelligent controller (BELFBIC) for three-phase induction motor V/f speed control. V/Hz control is simple and relatively easy to implement. It provides motor performance that is adequate for most applications. For the first time, this new design brain emotional learning and fuzzy-based intelligent controller is used for a space vector pulse width modulation inverter fed induction motor V/f speed control. A comparative analysis with a PID controller and a fuzzy controller is also carried out. The simulation is carried out by MATLAB/Simulink.

Proceedings of the 4th International Conference on Computer Engineering and Networks Springer

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 pointwith 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.

Theory and Applications, ICHSA 2018 Springer Nature

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 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

Proceedings of International Conference on Communication and Computational Technologies LAP Lambert Academic Publishing

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.

Select Proceedings of ETAEERE 2020 Newnes

This book reflects the latest research trends, methods and experimental results in the field of electrical and information technologies for rail transportation, which covers abundant state-of-the-art research theories and ideas. As a vital field of research that is highly relevant to current developments in a number of technological domains, the subjects it covered include intelligent computing, information processing, Communication Technology, Automatic Control, etc. The objective of the proceedings is to provide a major interdisciplinary forum for researchers, engineers, academicians as well as industrial professionals to present the most innovative research and development in the field of rail transportation electrical and information technologies. Engineers and researchers in academia, industry, and the government will also explore an insight view of the solutions that combine ideas from multiple disciplines in this field. The volumes serve as an excellent reference work for researchers and graduate students working on rail transportation, electrical and information technologies.

Proceedings of the 4th International Conference on Electrical and Information Technologies for Rail Transportation (EITRT) 2019 Springer Science & Business Media

The purpose of this project is to control speed of buck converter driven DC motor using PD-type fuzzy logic controller. At the beginning, the simulation (MATLAB simulink) is started with buck converter driven DC motor modeling. In this project, PD-type fuzzy logic controller is designed based on the membership function and the rule base. Thus, the designed PD-type fuzzy logic is applied to the buck converter driven DC motor model. The objective of the simulation is to predict the system response of the buck converter driven DC motor with different membership function. For the first model of PD-type fuzzy logic controller, it will use 3 membership functions which are equal to 9 rule base. Then for the second simulation, it will use 5 membership functions which are equal to 25 rule base and the last model of controller use 7 membership function that are equal to 49 rules. Fuzzy logic controller that is capable of improving its performance in the control of a nonlinear system whose dynamics is unknown or uncertain. This direct learning fuzzy controller is able to improve its performance without having to identify a model of the plant.

Advanced Fuzzy Logic Approaches in Engineering Science Springer

Motor speed control is very important in rotating machinery applications. There are many applications that have been developed based on motor speed control theory such as to run the machines at most factory automation industry as well known the machines are easiest to damage without controller. The speed control of motor is very difficult to be implemented by using conventional control techniques, as it requires a very complex mathematical model. The purpose of this project is to describe the research of fuzzy logic controller (FLC) design based on programmable logic controller (PLC) in order to control the speed of the motor. The model of the PLC that has been used in this project is OMRON CJIG-CPU42P where this PLC has a build in loop control that can be made the ladder diagram quite simple using function block in Cx-process tools. In this project, the system without controller shows that is an open loop control. Therefore, when break is applied there is no feedback for the system to increase the voltage in order for the motor to maintain the desired speed output. Compare by using the controller FLC, when the breaking is applied there is a feedback for the system to increase the voltage to get the desired output that the user need. From this hardware implementation there are five rules that have been used which is five membership functions with trapezoid and triangular shape. Analysis will be done and it shows that the triangular shape is much better compare to the trapezoid shape and without controller in the system. Before the controller will be implementing in the PLC, the simulations were done using MATLAB fuzzy logic toolbox and SIMULINK. The objective of the simulation is to predict the system response of the motor in with or without controller.

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