Closed Loop Speed Control Of Miniature Brushless Dc Motors

The speed control of DC motors is very crucial in applications where the importance of precision and protection. Purpose of a motor speed controller is to take a signal representing the required speed and to drive a motor at that speed. Micro controller can provide easy control of DC motor. This project is about speed control system of DC motor by using micro controller and it is a closed-loop control system. Pulse Width Modulation (PWM) technique is used where its signal is generated in microcontroller which is the signal will send to motor driver to vary the voltage supply to control motor speed.
Modeling and Control of Modern Electrical Energy Systems A step-by-step approach to the modeling, analysis, and control of modern electronically controlled energy systems In Modeling and Control of Modern Electrical Energy Systems, distinguished researcher Dr. Masoud Karimi-Ghartemani delivers a comprehensive discussion of distributed and renewable energy resource integration from a control system perspective. The book explores various practical aspects of these systems, including the power extraction control of renewable resources and size selection of short-term storage components. The interactions of distributed energy resources (DERs) with the rest of the electric power system are presented, as is a discussion of the ability of the DER to ride through grid voltage faults and frequency swings. Readers will also discover how to derive mathematical models of different types of energy systems and build simulation models for those systems. Modeling and Control of Electrical Energy Systems provides end-of chapter examples and problems, as well as: A thorough introduction to power electronic conversion, including power electronics and standard power electronic converters An in-depth treatment of feedback control systems, including frequency-domain (transfer function) approaches and time-domain (state space) approaches Comprehensive discussions of direct current DERs and single-phase alternating current DERs Fulsome explorations of three-phase distributed energy resources Perfect for researchers, practitioners, and professors with an interest in electronically interfaced modern energy systems, Modeling and Control of Modern Electrical Energy Systems will also earn a place in the libraries of senior undergraduate and graduate students of electrical engineering.
Proceedings of the European Control Conference 1995, Rome, Italy 5-8 September 1995
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 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.
NASA Technical Note
Modeling, Design and Simulation of Systems
Fundamentals of Electrical Drives
Power Transmission and Motion Control: PTMC 2004
Speed Control of Induction Motor Using Fuzzy
C and the 8051
Initially, the only electric loads encountered in an automobile were for lighting and the starter motor. Today, demands on performance, safety, emissions, comfort, convenience, entertainment, and communications have seen the working-in of seemingly innumerable advanced electronic devices. Consequently, vehicle electric systems require larger capacities and more complex configurations to deal with these demands. Covering applications in conventional, hybrid-electric, and electric vehicles, the Handbook of Automotive Power Electronics and Motor Drives provides a comprehensive reference for automotive electrical systems. This authoritative handbook features contributions from an outstanding international panel of experts from industry and academia, highlighting existing and emerging technologies. Divided into five parts, the Handbook of Automotive Power Electronics and Motor Drives offers an overview of automotive power systems, discusses semiconductor devices, sensors, and other components, explains different power electronic converters, examines electric machines and associated drives, and details various advanced electrical loads as well as battery technology for automobile applications. As we seek to answer the call for safer, more efficient, and lower-emission vehicles from regulators and consumer insistence on better performance, comfort, and entertainment, the technologies outlined in this book are vital for engineering advanced vehicles that will satisfy these criteria.
FCCS2012 is an integrated conference concentrating its focus on Future Computer and Control Systems. “Advances in Future Computer and Control Systems” presents the proceedings of the 2012 International Conference on Future Computer and Control Systems(FCCS2012) held April 21-22,2012, in Changsha, China including recent research results on Future Computer and Control Systems of researchers from all around the world.
Master electric circuits, machines, devices, and power electronics hands on-without expensive equipment. In LabVIEW for Electric Circuits, Machines, Drives, and Laboratories Dr. Nesimi Ertugrul uses custom-written LabVIEW Virtual Instruments to illuminate the analysis and operation of a wide range of AC and DC circuits, electrical machines, and drives-including high-voltage/current/power applications covered in no other book. Includes detailed background, VI panels, lab practices, hardware information, and self-study questions - everything you need to achieve true mastery.
Discusses Uses for the Microcomputer, Including Projects & Methods for Interfacing the Personal Computer with Its Environment
Brushless DC Motor Controller, AC Gear Motor, Permanent Magnet DC Motor, Large DC Motors, Brushless Electric Motor, Brushless DC Motor, DC Motors, Servo

Motor
High performance Induction Motor Drives using Microcontroller
Control Techniques Drives and Controls Handbook
Speed Control of Induction Motor Using Microcontroller
Model-Based Design and Simulation
Advances in Future Computer and Control Systems

-- To implement speed control of induction motor. -- To implement closed loop volt per hertz technique based speed control of induction Motor using Matlab Simulink. -- To implement the above proposed model using Microcontroller (8051) -- This type of drive is suitable for applications which do not require high levels of accuracy or precision, such as pumps and fans. -- Low cost because there is no feedback device, the controlling principle offers a low cost and simple solution to controlling economical AC induction motors.

A cross-coupled inlet-engine control system concept is presented for a supersonic propulsion system consisting of a mixed- compression inlet and a turbojet engine. The control system employs manipulation of both bypass door flow area and engine speed to stabilize normal shock position in the inlet. Specifically, the case of slow-acting bypass doors used as a reset control where engine speed is the primary means of shock position control is described. Experimental results are presented showing performance of the control system with a NASA-designed inlet and a turbojet engine operating at Mach 2.5 in the Lewis 10- by 10-Foot Supersonic Wind Tunnel.

This book presents deep analysis of machine control for different applications, focusing on its implementation in embedded systems. Necessary peripherals for various microcontroller families are analysed for machine control and software architecture patterns for high-quality software development processes in motor control units are described. Abundant figures help the reader to understand the theoretical, simulation and practical implementation stages of machine control. Model-based design, used as a mathematical and visual approach to construction of complex control algorithms, code generation that eliminates hand-coding errors, and co-simulation tools such as Simulink, PSIM and finite element analysis are discussed. The simulation and verification tools refine, and retest the models without having to resort to prototype construction. The book shows how a voltage source inverter can be designed with tricks, protection elements, and space vector modulation. Practical Control of Electric Machines: Model-Based Design and Simulation is based on the author’s experience of a wide variety of systems in domestic, automotive and industrial environments, and most examples have implemented and verified controls. The text is ideal for readers looking for an insight into how electric machines play an important role in most real-life applications of control. Practitioners and students preparing for a career in control design applied in electric machines will benefit from the book’s easily understood theoretical approach to complex machine control. The book contains mathematics appropriate to various levels of experience, from the student to the academic and the experienced professional. Advances in Industrial Control reports and encourages the transfer of technology in control engineering. The rapid development of control technology has an impact on all areas of the control discipline. The series offers an opportunity for researchers to present an extended exposition of new work in all aspects of industrial control.

Industrial electronics systems govern so many different functions that vary in complexity-from the operation of relatively simple applications, such as electric motors, to that of more complicated machines and systems, including robots and entire fabrication processes. The Industrial Electronics Handbook, Second Edition combines traditional and new

LabVIEW for Electric Circuits, Machines, Drives, and Laboratories
Soft Computing in Data Analytics
High-Power Converters and AC Drives
10th International Symposium on Neural Networks, ISNN 2013, Dalian, China, July 4-6, 2013, Proceedings, Part II
Degradation of Dynamic Stiffness at Low Speeds when Using Back-emf Tracking for Closed Loop Speed Control
Real Time Embedded and Sensorless Control using VisSimTM and PLECSTM

The volume contains original research findings, exchange of ideas and dissemination of innovative, practical development experiences in different fields of soft and advance computing. It provides insights into the International Conference on Soft Computing in Data Analytics (SCDA). It also concentrates on both theory and practices from around the world in all the areas of related disciplines of soft computing. The book provides rapid dissemination of important results in soft computing technologies, a fusion of research in fuzzy logic, evolutionary computations, neural science and neural network systems and chaos theory and chaotic systems, swarm based algorithms, etc. The book aims to cater the postgraduate students and researchers working in the discipline of computer science and engineering along with other engineering branches.

This book offers fundamental information on the analysis and synthesis of continuous and sampled data control systems. It includes all the required preliminary materials (from mathematics, signals and systems) that are needed in order to understand control theory, so readers do not have to turn to other textbooks. Sampled data systems have recently

gained increasing importance, as they provide the basis for the analysis and design of computer-controlled systems. Though the book mainly focuses on linear systems, input/output approaches and state space descriptions are also provided. Control structures such as feedback, feed forward, internal model control, state feedback control, and the Youla parameterization approach are discussed, while a closing section outlines advanced areas of control theory. Though the book also contains selected examples, a related exercise book provides Matlab/Simulink exercises for all topics discussed in the textbook, helping readers to understand the theory and apply it in order to solve control problems. Thanks to this combination, readers will gain a basic grasp of systems and control, and be able to analyze and design continuous and discrete control systems.

This book presents the latest cutting-edge technology in high-power converters and medium voltage drives, and provides a complete analysis of various converter topologies, modulation techniques, practical drive configurations, and advanced control schemes. Supplemented with more than 250 illustrations, the author illustrates key concepts with simulations and experiments. Practical problems, along with accompanying solutions, are presented to help you tackle real-world issues.

The objective of the International Conference on Power and Embedded Drive Control (ICPEDC2017) is to provide a common a platform for all researchers, professionals and engineers from all over the world to present and exchange their expertise in the field of Electrical machines and drives, controllers and power electronics The conference will provide premium forum for sharing knowledge, experience and creative ideas of the experts with the researchers, academicians and the participants, a platform for discussing new trends in drives with reliable control and power electronics and also provide sustainable solutions for application of electrical machines and power in day to day applications

Recent Advances in Power Electronics and Drives

Proceedings of International Conference on SCDA 2018

Sensorless Speed Control of Induction Motors Using Sliding Mode Control Strategy

Cloud and Fog Computing Platforms for Internet of Things

Simulations and Laboratory Implementation

Volume 4a

The Industrial Electronics Handbook, Second Edition combines traditional and newer, more specialized knowledge that will help industrial electronics engineers develop practical solutions for the design and implementation of high-power applications. Embracing the broad technological scope of the field, this collection explores fundamental areas, including analog and digital circuits, electronics, electromagnetic machines, signal processing, and industrial control and communications systems. It also facilitates the use of intelligent systems—such as neural networks, fuzzy systems, and evolutionary methods—in terms of a hierarchical structure that makes factory control and supervision more efficient by addressing the needs of all production components. Enhancing its value, this fully updated collection presents research and global trends as published in the IEEE Transactions on Industrial Electronics Journal, one of the largest and most respected publications in the field. Power Electronics and Motor Drives facilitates a necessary shift from low-power electronics to the high-power varieties used to control electromechanical systems and other industrial applications. This volume of the handbook: Focuses on special high-power semiconductor devices Describes various electrical machines and motors, their principles of operation, and their limitations Covers power conversion and the high-efficiency devices that perform the necessary switchover between AC and DC Explores very specialized electronic circuits for the efficient control of electric motors Details other applications of power electronics, aside from electric motors—including lighting, renewable energy conversion, and automotive electronics Addresses power electronics used in very-high-power electrical systems to transmit energy Other volumes in the set: Fundamentals of Industrial Electronics Control and Mechatronics Industrial Communication Systems Intelligent Systems

This totally reworked book combines two previous books with material on networking. It is a complete guide to programming and interfacing the 8051 microcontroller-family devices for embedded applications.

Electrical drives play an important role as electromechanical energy convert ers in transportation, material handling and most production processes. The ease of controlling electrical drives is an important aspect for meeting the in creasing demands by the user with respect to flexibility and precision, caused by technological progress in industry as well as the need for energy conser vation. At the same time, the control of electrical drives has provided strong incentives to control engineering in general, leading to the development of new control structures and their introduction to other areas of control. This is due to the stringent operating conditions and widely varying specifications - a drive may alternately require control of torque, acceleration, speed or position - and the fact that most electric drives have - in contrast to chem ical or thermal processes - well defined structures and consistent dynamic characteristics. During the last years the field of controlled electrical drives has undergone rapid expansion due mainly to the advances of semiconductors in the form of power electronics as well as analogue and digital signal electronics, eventu ally culminating in microelectronics and microprocessors. The introduction of electronically switched solid-state power converters has renewed the search for adjustable speed AC motor drives, not subject to the limitations of the mechanical commutator of DC drives which dominated the field for a century.

This book is all about running a brushless DC motor using a sensorless technique. The target of the work was to make a very simple operating method for a brushless motor and formulate a speed control mechanism. Initially the work was started with both considering back-EMF and without considering back-EMF. Because of more complexity in the back-

EMF sensing method, and as our intention was to make a simpler and cost effective operation, so finally we assembled our project the without back-EMF sensing. Even though being a simple and inexpensive machine, the performance was quite good. However adding back-EMF sensing in this machine can give it more dependability.TABLE OF CONTENTS: DECLARATIONIAPPROVALIIACKNOWLEDGEMENTIIILIST OF FIGURESVIIABSTRACTIXCHAPTER 1INTRODUCTION101.1.Introduction101.2.Historical Background101.3.Advantage over Traditional Method111.4.Objective of this Work121.4.1.Primary objectives121.4.2.Secondary Objectives121.5.Introduction to this Thesis12CHAPTER 2BRUSHLESS DC MOTOR142.1.Introduction142.2.Comparison of Brushless motor with brushed motors152.3.Structure of a BLDC152.3.1.Stator162.3.2.Rotor172.4.Operating Principle182.4.1.Sensored Commutation192.4.2.Conventional Control Method Using Hall-effect Sensors202.4.3.Sensorless Control222.5.Applications232.6.Summary24CHAPTER 3MOTOR DRIVE SYSTEMS253.1.Introduction253.2.Components of Drive Electronics253.3.Inverter263.3.1.Three-Phase Inverter263.3.1.1.120-Degree Conduction273.3.1.2.180-Degree Conduction293.4.Speed Control Techniques303.4.1.Open Loop Speed Control313.4.2.Closed Loop Speed Control313.4.2.1.Proportional-Integral (PI) Controller323.5.PWM based Methods333.5.1.Conventional 120° PWM technique333.5.2.PWM Duty Cycle Calculation333.6.Summary34CHAPTER 4SIMULATION354.1.Introduction354.2.Simulation354.2.1.Simulating Three-Phase Inverter364.2.2.Simulating Controller Unit384.3.Simulation Results394.3.1.Speed Control404.4.Summary40CHAPTER 5HARDWARE IMPLEMENTATION415.1.Introduction415.2.Equipments and Components425.3.Power Supply Unit435.4.Microcontroller Unit445.5.Motor Drive Unit455.6.Performance of the System465.7.Summary47CHAPTER 6DISCUSSIONS AND CONCLUSIONS486.1.Discussions486.2.Suggestion for future Work496.2.1.Limitations496.2.2.Future Scope496.3.Conclusions50REFERENCES51APPENDIX A53SPEED CONTROL FLOWCHART53APPENDIX B54MICROCONTROLLER CODES54APPENDIX C55ATMEGA32 (MICROCONTROLLER)556.3.1.Pin Descriptions556.3.2.Block Diagram586.3.3.Electrical Characteristics59APPENDIX D60L298 (DUAL FULL-BRIDGE DRIVER)606.3.4.Pin Configurations606.3.5.Maximum Ratings61

Speed Control of Sensorless Brushless DC Motor

Volume 2

2017 International Conference on Power and Embedded Drive Control (ICPEDC)

SPEED ESTIMATION TECHNIQUES FOR SENSORLESS VECTOR CONTROLLED INDUCTION MOTOR DRIVE.

On the Use of External Timing Cues to Regulate Speed During Human Walking and Running

17th Asia Simulation Conference, AsiaSim 2017, Melaka, Malaysia, August 27 – 29, 2017, Proceedings, Part I

Suitable for undergraduate and postgraduate courses in electrical drives, this book covers topics on: Dynamics and control of electrical drives; Selection of motor power rating; DC, induction and synchronous motor drives; Stepper motor and switched reluctance motor drives; Permanent magnet ac and brushless dc motor drives; and more.

Power Transmission and Motion Control 2004 (PTMC) comprises papers by authors from twelve countries. Presented at PTMC 2004- one of a series of annual Workshops held at the Bath University- this collection of well illustrated papers reports on latest developments from key international research centres in the fields of hydraulic and pneumatic motion control. Topics include: Drives, transmissions, and actuators Hydraulic and pneumatic components and systems Modelling and simulation Control Hydraulic fluids Condition monitoring Noise and Vibration Actuation systems Hydraulic system design Measurement techniques Essential reading for researchers and practitioners working in the fields of power transmission, motion control, hydraulics, and pneumatics.

Out of all parameters used to describe gait, overground speed is one of the most important. The importance of gait speed is highlighted when used as a measure of performance during exercise, or as a measure of function when walking ability is compromised. Because the ability to control gait speed is imperative to reach optimal results in both exercise and gait rehabilitation, a system that helps people to control their overground speed more accurately might be beneficial. Developing an overground speed control system was the main goal of this thesis. To gain insight in the performance enhancing effects that can be expected from such a system, my colleagues and I first determined the ability of recreational runners to accurately control their own speed. We then used a simulation approach to estimate the effect of pacing inaccuracy on optimal running performance. Our simulation results suggested that the existing pacing error (2.3±4.6%) would decrease optimal performance by approximately 5% for an average recreational runner. These results indicate that the performance of recreational runners could be improved by minutes for typical race distances, simply by helping them achieve and maintain their optimal speed. To determine the viability of controlling overground speed by prescribing step frequency, we quantified the dynamic response in walking and running speed following controlled perturbations in prescribed metronome frequency. We found that perturbations in metronome frequency triggered rapid and predictable changes in speed, suggesting that overground speed is indeed controllable by prescribing step frequency. However, due to the variability present in the speed response, both within and between

individuals, accurately controlling overground speed using an open-loop speed control system is not possible. To improve speed control performance we developed and built a closed-loop speed control system, which made the metronome frequency directly dependent on the instantaneous speed error. We tested the performance of this system in both walking and running, and found that the speed control accuracy of a closed-loop system was significantly better compared to self-paced running and an open-loop speed control system. Finally, we translated the speed control system into a training tool available to the general public.

· Provides an overall understanding of all aspects of AC electrical drives, from the motor and converter to the implemented control algorithm, with minimum mathematics needed · Demonstrates how to implement and debug electrical drive systems using a set of dedicated hardware platforms, motor setup and software tools in VisSimTM and PLECSTM · No expert programming skills required, allowing the reader to concentrate on drive development · Enables the reader to undertake real-time control of a safe (low voltage) and low cost experimental drive This book puts the fundamental and advanced concepts behind electric drives into practice. Avoiding involved mathematics whenever practical, this book shows the reader how to implement a range of modern day electrical drive concepts, without requiring in depth programming skills. It allows the user to build and run a series of AC drive concepts, ranging from very basic drives to sophisticated sensorless drives. Hence the book is the only modern resource available that bridges the gap between simulation and the actual experimental environment. Engineers who need to implement an electrical drive, or transition from sensored to sensorless drives, as well as students who need to understand the practical aspects of working with electrical drives, will greatly benefit from this unique reference.

Microprocessor Speed Control of a Closed-loop DC Motor

Select Proceedings of EPREC 2021

Applied Control of Electrical Drives

Closed Loop Ward-Leonard Speed Control

Power Electronics and Motor Drives

Automatic Pacing

Annotation A comprehensive guide to the technology underlying drives, motors and control units, this title contains a wealth of technical information for the practising drives and electrical engineer.

Encouraged by the response to the first edition and to keep pace with recent developments, Fundamentals of Electrical Drives, Second Edition incorporates greater details on semi-conductor controlled drives, includes coverage of permanent magnet AC motor drives and switched reluctance motor drives, and highlights new trends in drive technology. Contents were chosen to satisfy the changing needs of the industry and provide the appropriate coverage of modern and conventional drives. With the large number of examples, problems, and solutions provided, Fundamentals of Electrical Drives, Second Edition will continue to be a useful reference for practicing engineers and for those preparing for Engineering Service Examinations.

A guide to drives essential to electric vehicles, wind turbines, and other motor-driven systems Analysis and Control of Electric Drives is a practical and comprehensive text that offers a clear understanding of electric drives and their industrial applications in the real-world including electric vehicles and wind turbines. The authors—noted experts on the topic—review the basic knowledge needed to understand electric drives and include the pertinent material that examines DC and AC machines in steady state using a unique physics-based approach. The book also analyzes electric machine operation under dynamic conditions, assisted by Space Vectors. The book is filled with illustrative examples and includes information on electric machines with Interior Permanent Magnets. To enhance learning, the book contains end-of-chapter problems and all topics covered use computer simulations with MATLAB Simulink® and Sciamble® Workbench software that is available free online for educational purposes. This important book: Explores additional topics such as electric machines with Interior Permanent Magnets Includes multiple examples and end-of-chapter homework problems Provides simulations made using MATLAB Simulink® and Sciamble® Workbench, free software for educational purposes Contains helpful presentation slides and Solutions Manual for Instructors; simulation files are available on the associated website for easy implementation A unique feature of this book is that the simulations in Sciamble® Workbench software can seamlessly be used to control experiments in a hardware laboratory Written for undergraduate and graduate students, Analysis and Control of Electric Drives is an essential guide to understanding electric vehicles, wind turbines, and increased efficiency of motor-driven systems.

This work focuses on speed estimation techniques for sensorless closed-loop speed control of an induction machine based on direct field-oriented control technique. Details of theories behind the algorithms are stated and their performances are verified by the help of simulations and experiments. The field-oriented control as the vector control technique is mainly implemented in two ways: indirect field oriented control and direct field oriented control. The field to be oriented may be rotor, stator, or airgap flux-linkage. In the indirect field-oriented control no flux estimation exists. The angular slip velocity estimation based on the measured or estimated rotor speed is required, to compute the synchronous speed of the motor. In the direct field oriented control the synchronous speed is computed with the aid of a flux estimator. Field Oriented Control is based on projections which transform a three phase time and speed dependent system into a two co-ordinate time invariant system. These projections lead to a structure similar to that of a DC machine control. The flux

observer used has an adaptive structure which makes use of both the voltage model and the current model of the machine. The rotor speed is estimated via Kalman filter technique which has a recursive state estimation feature. The flux angle estimated by flux observer is processed taking the angular slip velocity into account for speed estimation. For closed-loop speed control of system, torque, flux and speed producing control loops are tuned by the help of PI regulators. The performance of the closed-loop speed control is investigated by simulations and experiments. TMS320F2812 DSP controller card and the Embedded Target for the TI C2000 DSP tool of Matlab are utilized for the real-time experiments.

Closed-loop Speed-control System with On-line Digital Controller

Advances in Neural Networks- ISNN 2013

Speed Control Concept in Closed Loop Current Source A.C. Drive Systems

Practical Control of Electric Machines

Power Semiconductor Drives

Modeling and Control of Modern Electrical Energy Systems

The two-volume set LNCS 7951 and 7952 constitutes the refereed proceedings of the 10th International Symposium on Neural Networks, ISNN 2013, held in Dalian, China, in July 2013. The 157 revised full papers presented were carefully reviewed and selected from numerous submissions. The papers are organized in following topics: computational neuroscience, cognitive science, neural network models, learning algorithms, stability and convergence analysis, kernel methods, large margin methods and SVM, optimization algorithms, varational methods, control, robotics, bioinformatics and biomedical engineering, brain-like systems and brain-computer interfaces, data mining and knowledge discovery and other applications of neural networks.

This two-volume set CCIS 751 and CCIS 752 constitutes the proceedings of the 17th Asia Simulation Conference, AsiaSim 2017, held in Malacca, Malaysia, in August/September 2017. The 124 revised full papers presented in this two-volume set were carefully reviewed and selected from 267 submissions. The papers contained in these proceedings address challenging issues in modeling and simulation in various fields such as embedded systems; symbiotic simulation; agent-based simulation; parallel and distributed simulation; high performance computing; biomedical engineering; big data; energy, society and economics; medical processes; simulation language and software; visualization; virtual reality; modeling and Simulation for IoT; machine learning; as well as the fundamentals and applications of computing.

Today, relevant data are typically delivered to cloud-based servers for storing and analysis in order to extract key features and enable enhanced applications beyond the basic transmission of raw data and to realize the possibilities associated with the impending Internet of Things (IoT). To allow for quicker, more efficient, and expanded privacy-preserving services, a new trend called Fog Computing has emerged: moving these responsibilities to the network's edge. Traditional centralized cloud computing paradigms confront new problems posed by IoT application growth, including high latency, limited storage, and outages due to a lack of available resources. Fog Computing puts the cloud and IoT devices closer together to address these issues. Instead of sending IoT data to the cloud, the fog processes and stores it locally at IoT devices. Unlike the cloud, fog-based services have a faster reaction time and better quality overall. Fog Computing, Cloud Computing, and their connectivity with the IoT are discussed in this book, with an emphasis on the advantages and implementation issues. It also explores the various architectures and appropriate IoT applications. Fog Computing, Cloud Computing, and Internet of Things are being suggested as potential research directions. Features: A systematic overview of the state-of-the-art in Cloud Computing, Fog Computing, and Internet of Things Recent research results and some pointers to future advancements in architectures and methodologies Detailed examples from clinical studies using several different data sets

Control Engineering

A Supersonic Inlet-engine Control Using Engine Speed as a Primary Variable for Controlling Normal Shock Position

Analysis and Control of Electric Drives

Control of Electrical Drives

Handbook of Automotive Power Electronics and Motor Drives

Ciarcia's Circuit Cellar