Speed Control Of Dc Motors With The L292 Switchmode Driver

In the current century, DC motors plays a vital role in industrial areas. The efficient motor, are motor that be able to control the speed. Motor speed is controller by signal representing from microcontroller, in this project, the power converter for DC motor application is developed. One type of common method is by using Pulse Width Modulation (PWM), to control the speed of DC motor. Rectifiers which converted AC to DC supply and buck/boost converter are used to step up/step down a voltage or current while DC motor used as a load. Supplies to the DC motor are developed and the output is controlled by using PWM. PIC microcontroller is used to generate the PWM wave which can be varied in duty ratio, in order to create another level of DC voltage. This project starts with design circuit of a buck-boo converter using Orcad software and also Proteus 7.6 professional. In addition, hardware prototype has been developed based on the circuit designed. The system performance are evaluated and analyzed in comparison with a simulation results, at the end of this project the motor speed will satisfied the desired speed.

This Book Is Prepared For Undergraduate Students Of Various Indian Universities And Those Preparing For Associate Membership Examination Of The Institution Of Electrical Engineers (India) As Well The Diploma In Electrical Engineering Examination Of Various Boards Of Technical Education Covering The Subjects Electric Drives And Control And Utilisation Of Electric Energy.The Chapter On Illumination Deals Extensively With The Principles Of The Interior, Factory Lighting And Flood Lighting Schemes As Well As The Features Of Street Lighting. A Section On Photometric Measurement Is Added Along With A Study Of Halogen Lamps And Energy Saving Fluorescent Lamps. The Chapter On Electric Drives And Control Covers The Recent Trends In Electric Traction Using Gto Thyristor Technology. Objective Type Questions Were Incorporated For Self Assessment.

Direct current (DC) motors have variable characteristics and are used extensively in variable-speed drives. DC motor can provide a high starting torque and it is also possible to obtain speed control over wide range. Why do we need a seed motor controller? For example, if we have a DC motor in a robot, if we just apply a constant power to each motor on a robot, then the poor robot will never be able to maintain a steady speed. It will go slower over carpet, faster over smooth flooring, slower up hill, faster down hill, etc. So, it is important to make a controller to control the speed of DC motor in desired speed. DC motor plays a significant role in modern industrial. These are several types of applications where the load on the DC motor varies over a speed range. These applications may demand high-speed accuracy and good dynamic responses. In home applications, washers, dryers and compressors are good example. In automotive, fuel pump control, electronic steering control, engine control and electric vehicle control are good examples of these. In aerospace, there are a number of applications, like centrifuges, pumps, robotic arm controls, gyroscope controls and so on.

Development of Control Shceme for DC Motor Speed Control Applications

Speed Control of Small D.C. Motors

Utilisation of Electric Power

Adaptive Speed Control of DC Motors Without Rational Transducers

Fundamentals, Types and Applications

Mixed-Signal Embedded Microcontrollers are commonly used in integrating analog components needed to control non-digital electronic systems. They are used in automatically controlled devices and products, such as automobile engine control systems, wireless remote controllers, office machines, home appliances, power tools, and toys. Microcontrollers make it economical to digitally control even more devices and processes by reducing the size and cost, compared to a design that uses a separate microprocessor, memory, and input/output devices. In many undergraduate and post-graduate courses, teaching of mixed-signal microcontrollers and their use for project work has become compulsory. Students face a lot of difficulties when they have to interface a microcontroller with the electronics they deal with. This book addresses some issues of interfacing the microcontrollers and describes some project implementations with the Silicon Lab C8051F020 mixed – signal microcontroller. The intended readers are college and university students specializing in electronics, computer systems engineering, electrical and electronics engineering; researchers involved with electronics based system, practitioners, technicians and in general anybody interested in microcontrollers based projects.

The development of technologies affects the demands of industries at the present time. Thus, automatic control has played a vital role in the advance of engineering and science. In today's industries, control of DC motors is a common practice. Therefore, implementation of DC motor controller is required. There are many types of controller that can be used to implement the elegant and effective output. One of them is by using a PI controller. PI stands for Proportional and Integral Controllers which are designed to eliminate the need for continuous operator attention thus provide automatic control to the system. Cruise control in a car and a house thermostat are common examples of how controllers are used to automatically adjust some variable to hold the measurement (or process variable) at the set-point. This project is focusing on implementing PI controller to control speed of a dc motor. The overall project is divided into two parts. The first part is concern on the simulation using MATLAB simulink where the dc motor is modeled and PI controller is tuned using Ziegler-Nichols rules and software tuning. The second part is implementing the simulation. This part is divided into another two parts, Graphical User Interface (GUI) development and hardware interfacing. GUI is built using National Instrument LabVIEW software with implementation of PI controller. An oscilloscope also had been build there. Hardware interfacing part is built with Mitsumi dc mini-motors, M3IE-1 Series, speed sensor and analog to digital converter, DAC8032. As the result, PI controller is capable to control the speed of dc motor followed the result from simulation.

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.

Speed Control of Dc Motor Using Pwm Technique

How To Control A Dc Motor With An Arduino

Speed Control of DC Motors

ELECTRO-MECHANICAL MODELING OF SEDM(SEPARATELY EXCITED DC MOTOR) & PERFORMANCE IMPROVEMENT USING DIFFERENT INDUSTRIAL CONTROLLERS

Minicomputer Speed Control of DC Motors

Recent advances in LSI technology and the consequent availability of inexpensive but powerful microprocessors have already affected the process control industry in a significant manner. Microprocessors are being increasingly utilized for improving the performance of control systems and making them more sophisticated as well as reliable. Many concepts of adaptive and learning control theory which were considered impractical only 20 years ago are now being implemented. With these developments there has been a steady growth in hardware and software tools to support the microprocessor in its complex tasks. With the current trend of using several microprocessors for performing the complex tasks in a modern control system, a great deal of emphasis is being given to the topic of the transfer and sharing of information between them. Thus the subject of local area networking in the industrial environment has become assumed great importance. The object of this book is to present both hardware and software concepts that are important in the development of microprocessor-based control systems. An attempt has been made to obtain a balance between theory and practice, with emphasis on practical applications. It should be useful for both practicing engineers and students who are interested in learning the practical details of the implementation of microprocessor-based control systems. As some of the related material has been published in the earlier volumes of this series, duplication has been avoided as far as possible.

Academic Paper from the year 2020 in the subject Computer Science - Miscellaneous, , language: English, abstract: In this paper we describe a technical system for DC motor speed control. The speed of DC motor is controlled using Neural Network Based Model Reference and Predictive controllers with the use of Matlab/Simulink. The analysis of the DC motor is done with and without input side Torque disturbance input and the simulation results obtained by comparing the desired and actual speed of the DC motor using random reference and sinusoidal speed inputs for the DC motor with Model Reference and Predictive controllers. The DC motor with Model Reference controller shows almost the actual speed is the same as the desired speed with a good performance than the DC motor with Predictive controller for the system with and without input side disturbance. Finally the comparative simulation result prove the effectiveness of the DC motor with Model Reference controller.

This clear and concise advanced textbook is a comprehensive introduction to power electronics.

Designing Integrated Projects

Speed Control of Sensorless Brushless DC Motor

Projects For You: Motor Speed Arduino

LabVIEW for Electric Circuits, Machines, Drives, and Laboratories

An Engineering Handbook

Electric Motor Control: DC, AC, and BLDC Motors introduces practical drive techniques of electric motors to enable stable and efficient control of many application systems, also covering basic principles of high-performance motor control techniques, driving methods, control theories and power converters. Electric motor drive systems play a critical role in home appliances, motor vehicles, robotics, aerospace and transportation, heating ventilating and cooling equipment’s, robotics, industrial machinery and other commercial applications. The book provides engineers with drive techniques that will help them develop motor drive system for their applications. Includes practical solutions and control techniques for industrial motor drive applications currently in use Contains MATLAB/Simulink simulation files Enables engineers to understand the applications and advantages of electric motor drive systems

In this book, Mathematical Modelling of a reference SEDM has been done & Transfer Function has been derived with simulated result. Later Parameter Identification has been carried out to find the suitable design criteria for testing different controllers (P, PI, PD, PID controllers) with the machine. As it turned out to be a stable system (as per Routh-Hurwitz Stability Criterion), different controllers has been used to evaluate the Step response of Open loop & Closed loop system with simulated result. Controller tuning has been done to find the best result for controlling speed of SEDM. Settling time, % Overshoot, Steady-State error & Rise time has been calculated for all the controllers. Later active RC realization of the best fitted controller has been done using Ideal PID Control Algorithm.

Catalog of motors. Answers technical questions on DC motors, speed controls, servo systems, & optical encoders.

Generation and Utilization of Electrical Energy

Brushless DC Motor Controller, AC Gear Motor, Permanent Magnet DC Motor, Large DC Motors, Brushless Electric Motor, Brushless DC Motor, DC Motors, Servo Motor

Novel Algorithms and Techniques in Telecommunications, Automation and Industrial Electronics

Applied Control Theory

Electric Motors and Drives

Generation and Utilization of Electrical Energy is a comprehensive text designed for undergraduate courses in electrical engineering. The text introduces the reader to the generation of electrical energy and then goes on to explain how this energy can be effectively utilized for various applications like welding, electric traction, illumination, and electrolysis. The detailed explanations of practical applications make this an ideal reference book both inside and outside the classroom.

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.Inverter263.1.Three-Phase Inverter263.1.1.120-Degree Conduction273.1.2.180-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

Updated to the 2011 National Electrical Code, ELECTRICITY 4: AC/DC MOTORS, CONTROLS, AND MAINTENANCE, 10e delivers practical coverage of the AC/DC motors, controls, and the maintenance portion of electrical theory content. It offers quick access to current information on DC motors, AC motors, motor control, electromechanical and solid-state relays and timers, synchronous motors, installation, sensyn units, motor maintenance, and more. Combining thorough explanations of how systems work with relevant, hands-on examples of electrical system operation, this text will help you develop the troubleshooting skills needed in the field. Important Notice: Media content referenced within the product description or the product text may not be available in the ebook version.

Development of a Microcontroller-based Speed Control System for DC Motors

Dealing with the Principles Involved in the Starting and Speed Control of D.c. Motors for i Dustrial Services, and with the Applications of These Principles to Typical Control Apparatus, with Many Examples from Practice

Electric Motor Control

New Developments Using ANFIS for DC Motors Speed Control

Digital Speed Control of a D.C. Motor

Nowadays, DC motors plays a vital role in most of the industrial areas, it can be seen in most of the electronic devices. The purpose of a motor speed controller is to take a signal representing the demanded speed, and to drive a motor at that speed. In this project, the power converter for DC motor application is developed. One of the most common methods is by using PWM wave to control the speed of the motor. Therefore, to provide the required power to the motor, SPMS is used to supply the DC motor from AC power supply. Rectifier which converted AC/DC and buck converter are combined which output can be supplied to the DC motor. The SMPS which supplies the DC motor is developed and the output is controlled by using PWM. TL494 is used to generate the PWM wave which can be varied in duty ratio. In the end of this project, the motor speed will satisfied the desired speed control as expected.

Following is the schematic diagram of the DC motor interface to the Arduino Uno board. ... Pin IN1 of the IC L298 is connected to pin 8 of Arduino while IN2 is connected to pin 9. These two digital pins of Arduino control the direction of the motor. The EN-A pin of IC is connected to the PWM pin 2 of Arduino This book is about controlling motors using Arduinos (called Genuinos outside the United States). I start with simple direct current (DC) motors, covering turning them on and off, controlling their speed, and reversing direction. I then get into more complicated motors.

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.

DC Motor Speed Control with the Precence of Input Disturbance using Neural Network Based Model Reference and Predictive Controllers

Digital Phase-Locked Loop Speed Control for a Brushless D.C. Motor

Pulsewidth Modulated Speed Control of Brushless DC Motors

Direct Current Machines

Embedded Microcontroller Interfacing

DC Motors - Speed Controls - Servo Systems: An Engineering Handbook is a seven-chapter text that covers the basic concept, principles, and applications of DC and speed motors and servo systems. After providing the terminology, symbols, and systems of units, this book goes on dealing with the basic theory, motor comparison, and basic speed control methods of motors. The subsequent chapters describe the phase-locked servo systems and their optimization and applications. These topics are followed by a discussion of the developments made by Electro-Craft in the field of DC Brushless Motors. The final chapter provides revised data sheets on Electro-Craft products and describes the models in the motomatic range of speed controls, servomotor controls, and digital positioning systems. This handbook is of great value to professional engineers and engineering students.

Speed control of d.c. motors by phase-locked loops (PLL) is becoming increasingly popular. Primary interest has been in employing PLL for constant speed control. This thesis investigates the theory and techniques of digital PLL to speed control of a brushless d.c. motor with a variable speed of operation. Addition of logic controlled count enable/disable to a synchronous up/down counter, used as a phase-frequency detector, is shown to improve the performance of previously proposed PLL control schemes. (Theses).

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.

A Simple Speed Control for Small D.c. Motors ...

Electricity 4: AC/DC Motors, Controls, and Maintenance

DC, AC, and BLDC Motors

Development of Buckboost Converter for DC Motor Speed Control Application

Adjustable Closed-loop DC Motor Speed Controller

Novel Algorithms and Techniques in Telecommunications, Automation and Industrial Electronics includes a set of rigorously reviewed world-class manuscripts addressing and detailing state-of-the-art research projects in the areas of Industrial Electronics, Technology and Automation, Telecommunications and Networking. Novel Algorithms and Techniques in Telecommunications, Automation and Industrial Electronics includes selected papers form the conference proceedings of the International Conference on Industrial Electronics, Technology and Automation (IETA 2007) and International Conference on Telecommunications and Networking (TeNe 07) which were part of the International Joint Conferences on Computer, Information and Systems Sciences and Engineering (CISSE 2007).

This second edition includes new material and supporting references on: robotics control; programmable logic controllers; self-tuning controllers; distributed computer control systems; and biotechnological control.

Until recently, few alternatives existed for the use of hydraulic and pneumatic actuators in primary flight control applications. With the advent of the samarium-cobalt permanent magnet brushless DC motor. Consideration must now be given to the utilization of an electromechanical actuator in missiles which require significant maneuvering capability and hence, greater torques. This thesis investigates the theory and techniques of pulse width modulator speed control of brushless DC motors. After describing basic pulse width modulation (PWM) concepts, two constant velocity control schemes are presented: current feedback and a limit cycle scheme. By calculating the motor form factor (a figure of merit for power losses in the switching transistors which comprise the PWM network), the relative worth of each scheme is then evaluated. An in depth study is conducted of the limit cycle approach, with an emphasis on the power loss reductions obtained through the reduction of the velocity limit settings. Originator-Supplied keywords included: Pulsewidth Modulation; Brushless DC Motors; Speed Control, Computer Programs, Fortran, Pascal language, Computerized Simulation, Theses. (Author).

Power Electronics and Motor Control

Pulse Width Modulation Speed Control of DC Motors

Clustering Based Fuzzy Controller for Speed Control of DC Motor

Speed Control of DC Motor Using PI Controller

Including Electric Drives and Electric Traction

Written for non-specialist users of electric motors and drives, this book explains how electric drives work and compares the performance of the main systems, with many examples of applications. The author's approach - using a minimum of mathematics - has made this book equally popular as an outline for professionals and an introductory student text. * First edition (1990) has sold over 6000 copies. Drives and Controls on the first edition: 'This book is very readable, up-to-date and should be extremely useful to both users and o.e.m. designers. I unhesitatingly recommend it to any busy engineer who needs to make informed judgements about selecting the right drive system.' New features of the second edition: * New section on the cycloconverter drive. * More on switched relectance motor drives. * More on vector-controlled induction motor drives. * More on power switching devices. * New 'question and answer' sections on common problems and misconceptions. * Updating throughout. Electric Motors and Drives is for non-specialist users of electric motors and drives. It fills the gap between specialist textbooks (which are pitched at a level which is too academic for the average user) and the more prosaic 'handbooks' which are filled with useful detail but provide little opportunity for the development of any real insight or understanding. The book explores most of the widely-used modern types of motor and drive, including conventional and brushless d.c., induction motors (mains and inverter-fed), stepping motors, synchronous motors (mains and converter-fed) and reluctance motors.

Basic Electrical and Electronics Engineering

Microprocessor-Based Control Systems

Electric Motors: Application And Control

DC Motors, Speed Controls, Servo Systems

Microprocessor-based Soft Variable Structure Control for D.C. Motor Speed Regulation