Dc Motor Speed Control Using Pid Controllers

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SIMS KANE

DC Motor Speed Control Using Digital Signal Processor Tata McGraw-Hill Education

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.

BeagleBone Cookbook

Lulu.com

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.

Adjustable Closed-loop DC Motor Speed Controller "O'Reilly Media, Inc."

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.
Republican State Committee Report GRIN Verlag
BeagleBone is an inexpensive web server, Linux desktop, and electronics hub that includes all the tools you need to create your own projects—whether it's robotics, gaming, drones, or software-defined radio. If you're new to BeagleBone Black, or want to explore more of its capabilities, this cookbook provides scores of recipes for connecting and talking to the physical world with this credit-card-sized computer. All you need is minimal familiarity with computer programming and electronics. Each recipe includes clear and simple wiring diagrams and example code to get you started. If you don't know what BeagleBone Black is, you might decide to get one after scanning these recipes. Learn how to use BeagleBone to interact with the physical world Connect force, light, and distance sensors Spin servo motors, stepper motors, and DC motors Flash single LEDs, strings of LEDs, and matrices of LEDs Manage real-time input/output (I/O) Work at the Linux I/O level with shell commands, Python, and C Compile and install Linux kernels Work at a high level with JavaScript and the BoneScript library Expand BeagleBone's functionality by adding capes Explore the Internet of Things
DC Motor Control - A case study Speed Control of Dc Motor Using Pwm Technique

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.

DC Motor Speed Control Using a Phase-locked Loop Routledge

Speed Control of Dc Motor Using Pwm TechniqueLAP Lambert Academic Publishing

D.C. Motor Speed-control Systems Using Thyristors Tata McGraw-Hill Education

""Covers all areas of computer-based data acquisition--from basic concepts to the most recent technical developments--without the burden of long theoretical derivations and proofs. Offers practical, solution-oriented design examples and real-life case studies in each chapter and furnishes valuable selection guides for

specific types of hardware.
Tata McGraw-Hill Education
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: DECLARATIONIAPPROVALIIACKNOWLEDGEMENTIIIILIST 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

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

Development of Buckboost Converter for DC Motor Speed Control Application Springer Science & Business Media With this revised edition we aim to present a text on Power Electronics for the UG level which will provide a comprehensive coverage of converters, choppers, inverters and motor drives. All this, with a rich pedagogy to support the conceptual understanding and integral use of PSPICE.

D.C. Motor Speed Control for Heavy Material Rolling Mills by Control of Motor Field Excitation GRIN Verlag

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.

Permanent Magnet DC Motor Speed Control Using Neuro-fuzzy Algorithm Elsevier

The speed of separately excited DC motor can be controlled from below and up to rated speed using chopper as a converter. The chopper firing circuit receives signal from controller and then chopper gives variable voltage to the armature of the motor for achieving desired speed. There are two control loops, one for controlling current and another for speed. The controller used is Proportional-Integral type which removes the delay and provides fast control. Modeling of separately excited DC motor is done. The complete layout of DC drive mechanism is obtained. The designing of current and speed controller is carried out. The optimization of speed controller is done using modulus hugging approach, in order to get stable and fast control of DC motor. After obtaining the complete model of DC drive system, the model is simulated using MATLAB(SIMULINK). The simulation of DC motor

drive is done and analyzed under varying speed and varying load torque conditions like rated speed and load torque, half the rated load torque and speed, step speed and load torque and stair case load. torque and speed.

DC Motor Speed Control Using Thyristor Converter and Single-phase Supply LAP Lambert Academic Publishing

This book can assist you to learn about embedded systems using an MSP432 microcontroller. This third edition was written based on the use of an MSP432P401R MCU and Code Composer Studio. This book can used as a support material for microcontroller and embedded system courses. This book covers MSP432, GPIO, timers, display, interrupt, and ADC. Moreover, this book covers topics of software architectures, PWM, motor control, serial communications, TI Driver library, TI RTOS, Power management, and embedded system security. This book was written for undergraduate engineering students and the audience having similar prior knowledge and skills.

DC Motors, Speed Controls, Servo Systems BookRix

This project deals with real time DC motor speed control, using the new generation TMS320LF2407A digital signal processor. A PID controller is designed using MATLAB for the desired controller characteristics. The controller coefficients are then discretized and

included in an assembly language or C program that implements the PID controller. Code composer studio is used to load and run the PID controller program to achieve real time control. Input to the DSP processor is given from potentiometer through ADC. Duty cycle is given as input to the controller which is used to calculate control voltage to generate PWM from ramp. The output from DSP processor is fed to the buck converter which is used to drive the DC motor.

PC Based DC Motor Speed Control LAP Lambert Academic Publishing

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 control 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.

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

The purpose of this study is in electronic scope to design a DC speed controller circuit controlled by computer as a GUI (Graphical User Interface) from minimum to maximum speed. This project is focus on the DC motor speed control by varying the duty cycle of Pulse With Modulation (PWM) signal via Computer (PC). Nowadays, the computers are widely used in daily applications as a graphical user interface (GUI) because it is easy to monitoring, save cost and time. In this project, PC used to generate PWM signals assisted by Microsoft Visual Basics software thus reduced hardware implementation in a system. PWM speed control is desirable due to its high power efficiency compare with another method of speed control like frequency control, current and voltage control. The motor averages the input duty cycle into a constant speed which is directly

proportional to the percent duty cycle. The Software send PWM signal to the driver circuit through the RS232 serial port. The driver circuit will boosted the PWM signal to drive the MOSFET and thus control the motor. The speed of DC motor is depending on the spectrum of PWM that refer to their duty cycle. This project was able to control the motor speed via PC from zero to maximum speed which is most important feature in industrials control applications.

DC Motor Speed Control with PID Control Using Visual Basic

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-boost 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.

FOUR QUADRANT DC MOTOR SPEED CONTROL WITH MICROCONTROLLER

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.

Speed Control of DC Motor Using Controller Area Network

In this book the four quadrant speed control system for DC motor has been studied and constructed. To achieve speed control, an electronic technique called pulse width modulation is used which

generates high and low pulses. These pulses vary in the speed of the engine. For the generation of these pulses, a microcontroller is used. It is a periodic change in the program. Different speed grades and the direction are depended on different buttons. The experiment has proved that this system is higher performance. Speed control of a machine is the most vital and important part of any industrial organization. This paper is designed to develop a four-quad speed control system for a DC motor using microcontroller. The engine is operated in four quadrants ie clockwise, counterclockwise, forward brake and reverse brake. It also has a feature of speed control. The four-quadrant operation of the dc engine is best suited for industries where engines are used and as a requirement they can rotate in clockwise, counter-clockwise and thus apply brakes immediately in both the directions. In the case of a specific operation in an industrial environment, the engine needs to be stopped immediately. In this scenario, this system is very integral. The PWM pulses generated by the microcontroller are instantaneous in both directions and as a result of applying the PWM pulses. The microcontroller used in this project is from 8051 family. Push buttons are provided for the operation of the motor which are interfaced to the microcontroller that provides an input signal to it and controls the speed

of the engine through a motor driver IC. The speed and direction of DC motor has been observed on digital CRO

MSP432P401R with Code Composer Studio

The book provides tools for the analysis of electrical machines fed on thyristor converters. A detailed exposition of dc and ac drives is given for making the right choice of drive for a required job to give the desired performances. The aspect of phase controlled converters, inverters, frequency conversion using these converters and the method of improving the line conditions are discussed in detail. Mathematical modelling of both dc and ac motors is given. The aspects of performance of induction and synchronous motors of variable frequency supplies are provided. Also discussed are the features of dc motors operating on converters with respect to commutation, speed range, etc. Methods of improvement in the performance are suggested. A short description of micro-processors in the control of thyristorised ac and dc drives is also included

Simulation of Dc Motor Speed Control Using Matlab/simulink

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.