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.

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.
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.

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.

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

The idea of motor speed control is to keep the rotation of the motor at the set speed. When used in speed applications, speed feedback control the DC motor’s speed or confirms that the motor is rotating at the desired speed. To maintain the speed, it requires the speed feedback at all times. The objective of this project is to use the algorithm of Proportional Integral Derivative (PID) controller to control the speed of the DC motor using Programmable Logic Controller (PLC) implementation. The used of PLC in this project will help to reduce complexity and easy to troubleshoot. The model of PLC which is used in this project is OMRON (CQM1H-CPS11) and the program for this controller system is in ladder diagram (CX programmer). The PID is implemented in the PLC program so that the system has a better response and less error. Finally, analysis of the response is made after the PID is implemented into the system.

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.

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.

Signal processing & analysis Power, Energy and industry Applications Power, Energy and industry Applications Components, Circuits, Devices and Systems

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

The book presents recent theoretical and practical information about the field of automation and control. It includes fifteen chapters that promote automation and control in practical applications in the following thematic areas: control theory, autonomous vehicles, mechatronics, digital image processing, electrical grids, artificial intelligence, and electric motor drives. The book also presents and discusses applications that improve the properties and performances of process control with examples and case studies obtained from real-world research in the field. Automation and Control is designed for specialists, engineers, professors, and students.

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 controlled 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.

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.

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.

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.

The speed control of DC motors is very crucial in applications where the importance of precision and protection. The control 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.

**"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.**

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.

Linear Quadratic Regulator (LQR) algorithm is one of the controller methods to control a system. In this project, the LQR was implemented on the PIC microcontroller to control the dc motor. The main objective of this controller is to minimize the deviation of the speed of dc motor. Dc motor speed is controlled by its driving voltage. The higher the voltage, the higher the motor speed. The speed of the motor is specifying that will be the input voltage of the motor and the output will be compare with the input. As the result, the output must be the same as or approximately the same as the input voltage. In this project, the LQR algorithm was implemented on the PIC microcontroller so the result can be shown. Before the implementation on the PIC, the dc motor state-space has to be derived. Then, from the state-space, we can design the LQR controller by using the MATLAB software. The stable system is got by tuning the Q and R value that can be seen by the simulation.

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