

FINAL YEAR PROJECT REPORT
SPEED CONTROL of DC MOTOR Using PID
through ARDIUNO



A PROJECT REPORT

Submitted by

M. Jurair Saqib
Umar Aziz
Syed Muhammad Bilal Shah

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Submitted by

M. Jurair Saqib (111619-237)
Umar Aziz (111619-236)
Syed Muhammad Bilal Shah (111619-196)

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Project Advisor _____ Director Projects _____

DEPARTMENT OF ELECTRICAL ENGINEERING

SCHOOL OF ENGINEERING

UNIVERSITY OF MANAGEMENT AND TECHNOLOGY

Declaration of Originality

Here by we pronounce that work and advancement expressed in this report and undertaking is totally our own particular work and nothing in this archive is duplicate glue from some other sources.

Group member's signature

Umar Aziz

M. Jurair Saqib

Bilal Shah

Advisor Signature

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Abstract

DC motors are widely used from toy cars to locomotives, treadmills and industrial conveyors etc. But as the load increase on motor's shaft its speed goes down which is not desired. This is the first propose of this research paper to design a closed loop system that maintains the speed of dc motor to a set point. To achieve this a Proportional Integral and Derivative (PID) controller was used as a compensator which is given the error signal (difference between set point and output of system) to produce a gain then this is used by the Arduino to generate a Pulse Width Modulated (PWM) signal and is given to motor drive to change the time for which power is given to the motor resulting in desired speed of motor with minimum power loss. Now the issue is to tune the parameters of PID controller for best response, this is the second part of the project to chose the best controller PI or PID and then optimally tune the controller to increase efficiency of the system i.e. response of the system (reducing the rise time, settling time, overshoot and steady state error). This optimum tuning was achieved using three different methods including: Root-locus, Hit and trial and Ziegler Nicholas methods, all these methods were implemented on MATLAB after developing motor model with variable load. The root-locus method was used by changing the position of poles of the open loop step response of the system and then checking the outcome (the rise time, settling time, overshoot and steady state error). Similarly hit and trial and Ziegler Nicholas methods were implemented by changing the values of K_p , K_i , K_d randomly until a stable and robust system was achieved for all three types of controllers i.e. PI, PD, PID, afterwards the response of system for all controllers was compared for all tree methods and best of which was used moreover the parameters of best controller were implemented on hardware and the outcome was reasonably efficient.

