BRUSHLESS DC MOTOR CONTROLLER

BILAL ABDULLAH	**091420-036**
ANWAR UL HAQ	**091420-047**
TAIMOOR TALAT	**091420-067**

PROJECT ADVISOR

SIR ASIF HUSSAIN

A project report submitted in partial fulfilment of the requirements for the award of the degree of BS Electrical Engineering

School of Engineering

University of Management and Technology

2009- 2013

BRUSHLESS DC MOTOR CONTROLLER

ABSTRACT

Electrical equipment often has at least one motor used to rotate or displace an object from its initial position. There are a variety of motor types available in the market, including induction motors, servomotors, DC motors (brushed and brushless), etc. Depending upon the application requirements, a particular motor can be selected. However, a current trend is that most new designs are moving towards Brushless DC motors, popularly known as BLDC motors.

Brushless DC motors (BLDCM) are generated by virtually inverting the stator and rotor of simple DC motors. By removing of brushes we can eliminate many problems associated with brushes. Another advantage is the ability to produce a larger torque because of the rectangular interaction between current and flux.

Classical DC motors are no doubt good and simple but inefficient in some ways. Although dc motors possess good control characteristics but their performance and applications are limited due to sparking and commutation problems. The Brushless DC (BLDC) motor is able to overcome the limitations mentioned above and satisfy the requirements of a variable speed drive.

BLDC motors have many similarities to AC induction motors and brushed DC motors in terms of construction and working principles respectively. Like all other motors, BLDC motors also have a rotor and a stator.

DECLARATION

It is hereby declare that this project report is based on our original team work except for citations and quotations which have been duly acknowledged. It also declares that it has not been previously and concurrently submitted for any other degree or award at other institutions.

Signatures : _____

Name's : _____

ID No’s. : _____

Date : _____

APPROVAL FOR SUBMISSION

It is to certify that this project report entitled **"SIMULATION OF BRUSHLESS DC MOTOR CONTROLLER"** was prepared by **BILAL ABDULLAH, ANWAR UL HAQ & TAIMOOR TALAT** has met the required standard for submission in partial fulfilment of the requirements for the award of Bachelor of Science (Electrical. Engineering) at University of Management and Technology.

Approved by: _____

Signature : _____

Supervisor : Sir Asif Hussain

Date : _____

ACKNOWLEDGEMENTS

First of all, we would like to thank Allah Almighty for giving us strength to complete our final year project. We are very grateful to The Dept. of Electrical Engineering., for giving me the opportunity to execute this project, which is an integral part of the curriculum in B.S (EE) programme at University of Management and Technology (UMT). We would also like to take this opportunity to express heartfelt gratitude for our project advisor Mr. Salman Khaliq, who provided us with valuable inputs at the critical stages of this project execution, the project couldn't complete without the support and guidance of our advisor and also thanks to everyone who had contributed to the successful completion of this project. We also want to take this opportunity to give our special thanks to the University of Management and Technology (UMT) for letting us be a part of it for the last four years and the facilities and support it provided for the completion of our final year project and to thank the Chairman of Electrical Engineering Dept, Dr Sajjad H.Shami for his support to the final year students.

In addition, we would also like to express our gratitude to our parents, teachers and friends who had helped and given us encouragement and providing continuous guidance and wholehearted support throughout the project.....

LIST OF CONTENTS

TABLE OF CONTENTS

CHAPTER

LIST OF FIGURES

LIST OF TABLES

CHAPTER 1

BRUSHLESS DC MOTOR

1.1 Introduction

Electrical equipment often has at least one motor used to rotate or displace an object from its initial position. There are a variety of motor types available in the market, including induction motors, servomotors, DC motors (brushed and brushless), etc. Depending upon the application requirements, a particular motor can be selected. However, a current trend is that most new designs are moving towards Brushless DC motors, popularly known as BLDC motors. Brushless Direct Current (BLDC) motors are one of the motor types rapidly gaining popularity. BLDC motors are used in industries such as Appliances, Automotive, Aerospace, Consumer, Medical, Industrial Automation Equipment and Instrumentation.

As the name implies, BLDC motors do not use brushes for commutation; instead, they are electronically commutated. BLDC motors have many advantages over brushed DC motors and induction motors. A few of these are:

- Better speed versus torque characteristics
- High dynamic response
- High efficiency
- Long operating life
- Noiseless operation
- Higher speed ranges

In addition, the ratio of torque delivered to the size of the motor is higher, making it useful in applications where space and weight are critical factors.