

# **BRUSHLESS DC MOTOR CONTROLLER**

<b>BILAL ABDULLAH</b>	<b>091420-036</b>
<b>ANWAR UL HAQ</b>	<b>091420-047</b>
<b>TAIMOOR TALAT</b>	<b>091420-067</b>

**PROJECT ADVISOR**  
**SIR ASIF HUSSAIN**



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## **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 : \_\_\_\_\_

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**LIST OF CONTENTS**

<b>ABSTRACT</b>	<b>2</b>
<b>DECLARATION</b>	<b>3</b>
<b>APPROVAL FOR SUBMISSION</b>	<b>4</b>
<b>ACKNOWLEDGEMENTS</b>	<b>5</b>
<b>TABLE OF CONTENTS</b>	<b>7</b>
<b>LIST OF FIGURES</b>	<b>9</b>
<b>LIST OF TABLES</b>	<b>10</b>

## TABLE OF CONTENTS

### CHAPTER

<b>1</b>	<b>BRUSHLESS DC MOTOR</b>	<b>11</b>
	1.1 Introduction	11
<b>2</b>	<b>Brushless DC MOTOR</b>	Error! Bookmark not defined.
	2.1 Theory of Operation	<b>Error! Bookmark not defined.</b>
	2.2 Stator	<b>Error! Bookmark not defined.</b>
	2.3 Rotor	<b>Error! Bookmark not defined.</b>
	2.4 Working Principles and Operation	<b>Error! Bookmark not defined.</b>
	2.5 Commutation Implementation	<b>Error! Bookmark not defined.</b>
	2.6 Speed control	<b>Error! Bookmark not defined.</b>
	2.7 Torque control	<b>Error! Bookmark not defined.</b>
	2.8 Motor Protection	<b>Error! Bookmark not defined.</b>
	2.8.1 Peak Current	<b>Error! Bookmark not defined.</b>
	2.8.2 Maximum Working Current	<b>Error! Bookmark not defined.</b>
	2.8.3 Under Voltage	<b>Error! Bookmark not defined.</b>
	2.9 Hall Sensor Failure	<b>Error! Bookmark not defined.</b>
<b>3</b>	<b>PWM INVERTERS</b>	Error! Bookmark not defined.
	3.1 Abstract	<b>Error! Bookmark not defined.</b>
	3.2 Introduction	<b>Error! Bookmark not defined.</b>
	3.3 Duty Cycle	<b>Error! Bookmark not defined.</b>
	3.4 Techniques	<b>Error! Bookmark not defined.</b>
	3.5 Advantages of PWM	<b>Error! Bookmark not defined.</b>
	3.6 PWM Technology	<b>Error! Bookmark not defined.</b>
	3.7 Operation	<b>Error! Bookmark not defined.</b>
	3.8 Space Vector Pulse Width Modulation	<b>Error! Bookmark not defined.</b>

- 3.8.1 Introduction **Error! Bookmark not defined.**
- 3.8.2 Concept **Error! Bookmark not defined.**
- 3.8.3 Advantages of SVPWM  
Compared to Sinusoidal PWM **Error! Bookmark not defined.**
- 3.9 Conclusion **Error! Bookmark not defined.**
- 3.10 Switching Bus with IGBTs **Error! Bookmark not defined.**

#### **4**

#### **SIMULATION**

- 4.1 Block Diagram
- 4.2 Matlab Circuit
- 4.3 Results

#### **SUMMARY**

**Error! Bookmark not defined.**

#### **REFERENCES**

**Error! Bookmark not defined.**

**LIST OF FIGURES**

<b>FIGURE</b>	<b>TITLE</b>	<b>PAGE</b>
2.1	Laminated steel stampings - Stator	13
2.2	Slotted and Slotless Motor	13
2.3	BLDC Motor Rotor	14
2.4	BLDC Motor Magnetic Field	15
2.5	Phase Diagram	16
2.6	Control circuit for 3 phase BLDC windings	17
2.7	Circuit Diagram of BLDC Motor	18
2.8	Switching sequence	18
2.9	Voltage and current through the windings	19
2.10	Switching signals of Power devices	20
2.11	Speed control loop	20
2.12	Torque control	21
2.13	Implementation of BLDC motor control system using PSoC	23
3.1	Three-phase voltage source inverter using power transistors	26
3.2	Output phase and line voltages from the inverter	27
3.3	Drive Output Waveform	30
3.4	Drive Output Waveform Components	31
4.1	Matlab Circuit	32
4.2	Simulation Results	33

**LIST OF TABLES**

<b>TABLE</b>	<b>TITLE</b>	<b>PAGE</b>
1.1	Switching sequence	19

## 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.