

**DETERMINATION OF DIRECTION OF QIBLA USING MATHEMATICAL
CALCULATION METHODS**

MUHAMMAD IZDIHAR AFIQ BIN NOR A'ZLAN

AHMAD AZHAN BIN HAMIZON

Thesis submitted in Fulfilment of the Requirement for Bachelor of Science

(Hons.) Computational Mathematics in the Faculty of Computer and

Mathematical Sciences University Teknologi MARA

2019

DECLARATION BY CANDIDATE

We certify this report and the project to which it refers is the product of our own work and that any idea or quotation from the work of other people, published or otherwise are fully acknowledged in accordance with standard referring practices of the discipline.



.....
MUHAMMAD IZDIHAR AFIQ BIN NOR A'ZLAN

2016299168

11 JULY 2019



.....
AHMAD AZHAN BIN HAMIZON

2016289584

11 JULY 2019

ABSTRACT

Nowadays, many Muslims find it easier to perform their prayers compared to the past due to modern technologies aiding them. One of the important aspects of Muslims' prayers is the qibla, which is the direction of the Kaaba. It is an important piece of knowledge to know the direction of qibla as it is necessary for Muslims to perform the *sholat* 5 times a day. In recent times, modern technology has greatly improved the lives of Muslims who are performing *sholat* by simply clicking on an app that instantly tells them the direction of qibla. However, with the rise of counterfeit apps and hacking on smartphones, many Muslims want to find an alternative way to find the direction of qibla without the use of technology. The goal of this research is to provide a mathematical calculation method to find the direction of qibla so that Muslims can perform the *sholat*. To find the method, the research aims to compare two methods: the spherical trigonometry method and the vector calculus method, to see which is the best by comparing both methods to existing data. For example, Bandar Seri Begawan in Brunei has a latitude and longitude of 4.9031° N and 114.9398° E respectively. By using both the spherical trigonometry method and the vector calculus method, we obtained results of 290.8611 and 290.8967 respectively. By completing this research, the project will provide Muslims with the best calculation method needed to find the direction of qibla.

TABLE OF CONTENTS

| | Page |
|--------------------------------------|-------------|
| DECLARATION BY THE SUPERVISOR | ii |
| DECLARATION BY THE CANDIDATE | iii |
| ACKNOWLEDGEMENT | iv |
| ABSTRACT | v |
| LIST OF FIGURES | ix |
| LIST OF TABLE | x |
| | |
| CHAPTER 1 : INTRODUCTION OF RESEARCH | |
| | |
| 1.1 Introduction | 1 |
| 1.2 Background of Research | 1 |
| 1.3 Problem Statement | 2 |
| 1.4. Objective | 3 |
| 1.5 Significance of Research | 4 |
| 1.6. Scope of Study | 4 |
| 1.7 Project Benefit | 4 |
| 1.8 Definition of Terms and Concepts | 5 |
| 1.9 Literature Review | 6 |
| 1.10 Organization of Research | 13 |

CHAPTER 2 : METHODOLOGY

| | |
|--------------------------------------|----|
| 2.1. Introduction | 16 |
| 2.2. Fundamental of Research | 16 |
| 2.2.1. Spherical Trigonometry Method | 16 |
| 2.2.2. Vector Calculus Method | 19 |
| 2.3. Research Step | 25 |

CHAPTER 3 : IMPLEMETATION OF THE RESEARCH

| | |
|--|----|
| 3.1 Introduction | 28 |
| 3.2 Tabulated data | 28 |
| 3.3 Determined the latitude and longitude of point of interest | 29 |
| 3.4 Apply Spherical Trigonometry Method | 29 |
| 3.5 Apply Vector Calculus Method | 31 |
| 3.6 Construct data table | 33 |
| 3.7 Compare both data to find best data | 35 |
| 3.8 Conclusion | 37 |

CHAPTER 4 RESULT AND DISCUSSION

| | |
|---|----|
| 4.1. Introduction | 38 |
| 4.2. Result of Direction of Qibla From Methods Used | 38 |
| 4.3. Discussion of Research | 44 |
| 4.4. Conclusion | 46 |