

**GRAPHICAL USER INTERFACE OF ORDINARY
DIFFERENTIAL EQUATION SOLUTION WITH NUMERICAL
METHOD**

MUHAMMAD IKHWAN BIN AZMAN

**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**

2018

DECLARATION

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



.....

MUHAMMAD IKHWAN BIN AZMAN

2013638218

JUNE 7, 2018

ABSTRACT

First and second order ordinary differential equations (ODE) can be solve by several numerical methods. Runge-Kutta (RK) is one of the most popular and accurate numerical method for solving ODE. There are several versions of RK available. In this research, several problems of first order ODE is selected to be solve using Runge-Kutta of fourth, fifth and sixth. A user friendly Graphical User Interface is also developed for ease of application for these RK versions

TABLE OF CONTENT

DECLARATION BY SUPERVISOR	i
DECLARATION	ii
ACKNOWLEDGEMENT	iii
TABLE OF CONTENT	iv
LIST OF TABLE	ix
LIST OF FIGURE	x
ABSTRACT	xi

CHAPTER 1 INTRODUCTION

1.1 Introduction	1
1.2 Fundamental Concept	1
1.3 Problem Statement	5
1.4 Objectives	5
1.5 Significant of the Project	6
1.6 Scope of the project	6
1.7 Project Benefit	7
1.8 Definition of term and concept	7
1.9 Literature Review	8

CHAPTER 2 METHODOLOGY

2.1 Introduction	11
2.2 Fundamental of Ordinary Differential Equation	11
2.3 Fundamental of Runge-Kutta	12
2.4 Research Step	15

CHAPTER 3 IMPLEMENTATION

3.1 Introduction	18
3.2 Example of Differential Equation Solution	18
3.2.1 Solution for 1 st Order ODE	19
3.2.2 Solution for Bernoulli's ODE	21
3.2.3 Solution of Seperable ODE	25
3.3 Implementation of Different Order of RK method	27
3.3.1 Runge-Kutta Fourth Order	27
3.3.2 Runge-Kutta Fifth Order	29
3.3.3 Runge-Kutta Sixth Order	31
3.4 Error Calculation	34
3.5 Conclusion	34

CHAPTER 4 RESULT AND DISCUSSION

4.1 Introduction	35
4.2 Numerical Result	35
4.3 Error Analaysis	41
4.4 Conclusion	44