

UNIVERSITI TEKNOLOGI MARA

TECHNICAL REPORT

SOLVING THE SIRC MODEL OF THE INFLUENZA
A
BY USING FORTH ORDER RUNGE KUTTA
METHOD

AZIDA BINTI SHAHARUDDIN
2014808316 K15/20
NURUL AISYAH BINTI HAJA MUHAIADIN
2014250292 K15/20
SUHAIFANIZA FASYA BINTI SAIFUL ANUAR
2014438846 K15/20

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IN THE NAME OF ALLAH, THE MOST GRACIOUS, THE MOST MERCIFUL

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ABSTRACT

The best mathematical model to explain H1N1 disease is SIRC model which is in the form of system of Ordinary Differential Equation (ODE). Parameters used in the ordinary differential equation (ODE) are different as the surrounding of H1N1 are different. Hence, the accuracy of SIRC model depends on parameters. The main objective of this project is to solve the mathematical model for H1N1 in order to calculate population and to observe the trend of solutions if different parameters are used. Rungge-Kutta method is applied in solving the system of ordinary differential equations SIRC model since previous studies proved that there is no analytical solution for the SIRC model. For the conclusion of this project, the best SIRC model with the most appropriate parameters is identified.

1 INTRODUCTION

1.1 INTRODUCTION

H1N1 is a seasonal disease that can be contracted by humans and animal. Government spend a lot of money to support and cure this disease. For example, United spent more than US10 billion for the people are infected by this disease and it is treatment. According to (Chan, 2009) H1N1 is commonly known as swine flu due to contagious respiratory. This disease affects the nose, throat, bronchi and lung. Actually, there are 3 types of influenza viruses which is A, B and C. Type A is a virus can be contracted by human and animal but only human will suffer for this type of virus. Type B and C only spread within human from infected people and this type of virus is more secure than virus A.

1.2 PROBLEM STATEMENTS

A lot of studies conducted to determine the inter-pandemic ecology of influenza A in humans by the mathematical model (chan, 2009). In addition, mathematical approach is needed to predict and calculate each population of H1N1. The first mathematical model to explain H1N1 disease is SIR model. From the previous studies, the best mathematical equation to describe diseases are usually in the form of system of differential equations. Early research have stated disease model cannot be solved using analytically method. So, SIRC are solving by using Runge-Kutta. Differential equation will be the best to explain the disease if parameter used is accurate. There are four types of subgroups for this SIRC model, which is modelled by system of Ordinary Differential Equation (ODE). Besides that, early research have stated disease model cannot be solved using analytically method.

In short, the questions to be answered are:

1. How to develop SIRC model?
2. How to apply Runge-Kutta method in solving SIRC model?