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# Fakulti Sains Komputer, Dan Matematik

**TECHNICAL REPORT**

**FINAL YEAR PROJECT**

**CS249**

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**THE SPREADNESS AND CONTROL OF HIV/AIDS INFECTION USING SIR-MODEL**


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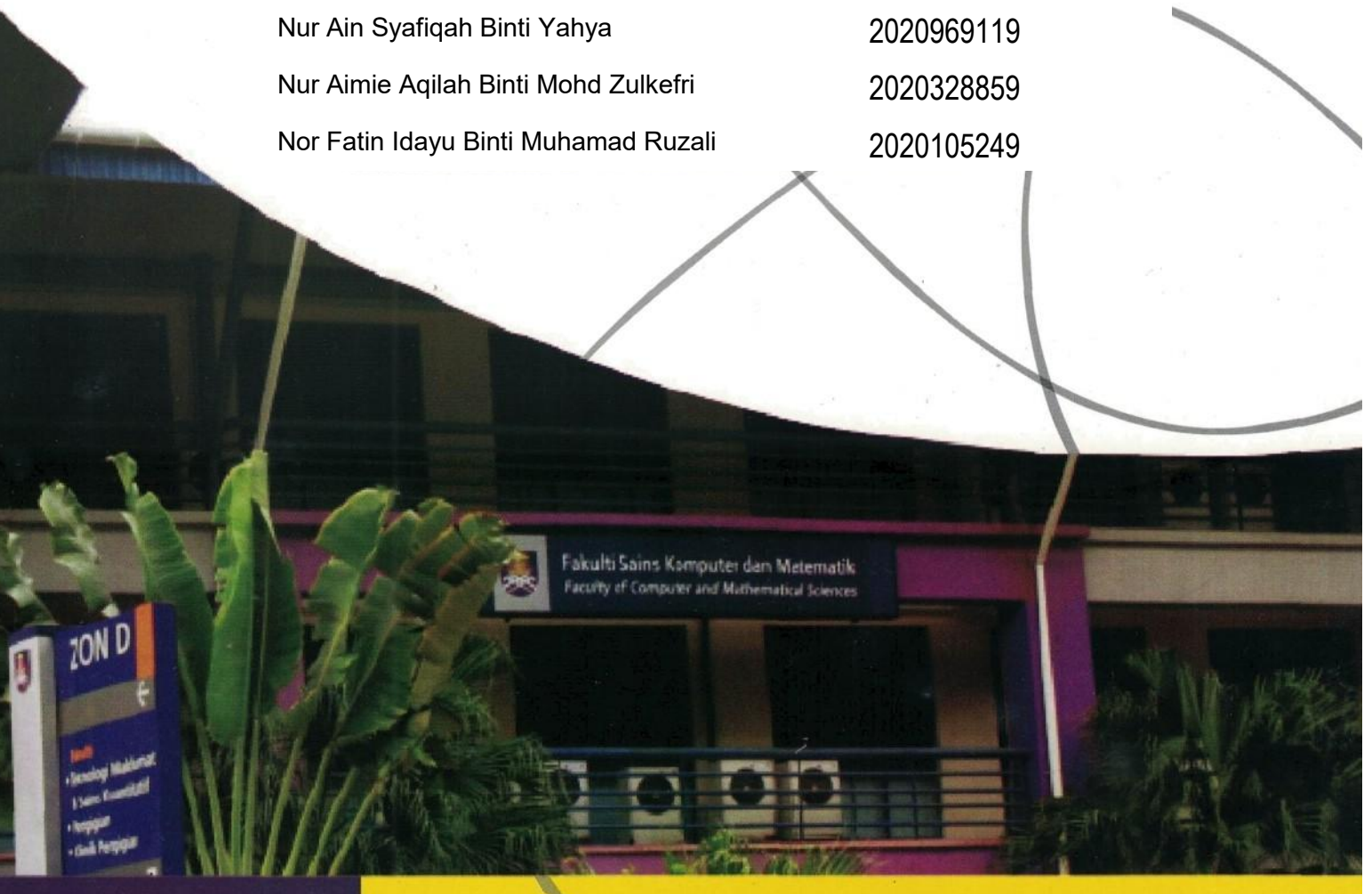

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## ABSTRACT

While the international donor community has spent millions on Human Immunodeficiency Virus (HIV)/Acquired Immunodeficiency Syndrome (AIDS) prevention through educational programmes, the trend of the spread is rarely analyzed. The aim of this research is to calculate the basic reproductive number for HIV/AIDS spread awareness among community to prevent from increasing cases in the future by analyzing the basic reproductive number. Using the *SIR* model, this study examines fundamental reproduction numbers and makes predictions regarding the amount of infections. The global HIV/AIDS epidemic poses a threat to the workforce in the national development sector, which is why the problem has become the prime motive for this research. For a country that relies on youth labour, the decrease of such a large number of potential human resources due to this epidemic can have a significant impact on Malaysia. We also present the basic reproduction number, which is a crucial concept in infectious disease epidemiology and refers to the risk of an infectious agent spreading during an outbreak. In methodology part, we also stated step involved to outcome the result which are finding the rate of susceptible, infected and recovered population, set the value of all parameters involved and lastly substitute data and parameters value in each of compartment's equation. The findings revealed that the forecasted for susceptible and infected HIV/AIDS cases will keep diminish while recovered HIV/AIDS cases raising year after year. This is because the rate of recovery showed that it is less than zero which means it will eventually diminish and no cases for HIV/AIDS infection. The differences between observed and forecasted susceptible, infected and recovered populations among Malaysian commitee is illustrated using Microsoft Excel as a consequence of this study. If HIV/AIDS continues to be a disaster for society, the community will become increasingly conscious of the rate of infectious agent transmission if it is not regulated.

# 1 INTRODUCTION

## 1.1 Research Background

Infectious diseases are caused by living organisms such as viruses and bacteria. They are contagious and can be transmitted from person to person through body secretions, insects, or other means. SARS, influenza, the common cold, dengue, tuberculosis (TB), and hepatitis A and B are examples of infectious diseases. In fact, some of these diseases have been affecting Malaysians on a regular basis in a recent year while others have reappeared in the population after being under control for several years. Infectious diseases can have severe effects on your health and consequently, finances. According to Spec et al. (2017), due to the complexity of the disease, an infectious disease (ID) consultation is frequently acquired to treat patients with cryptococcus, however this has never been shown to have an impact on outcomes. A large outbreak can overwhelm the health system, restricting its ability to handle routine health problems and compounding the situation. Other than that, fear of infection may lead to social isolation or the closure of schools, businesses, commercial institutions, transportation and public services which can affect economic and other socially valuable activity.

Currently, Malaysia facing another new disease categorized as a pandemic known as the severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2). This disease was technically called Coronavirus disease 2019 (COVID-19) by WHO on 12 February 2020 after first detected in Wuhan, China. Coronavirus are viruses that can spread from person to person through droplets from coughing, sneezing or breathing. Coronavirus are a type of virus that can cause mild to moderate upper respiratory tract infections such as common cold, sever acute respiratory syndrome (SARS) and Middle East respiratory syndrome (MERS). To put an end to this pandemic, people must immune to the virus. A vaccination is the most secure way to do this. Vaccines are technology which mankind has often depended since a long time in the past to reduce the death toll from infectious diseases. According to Ministry of Health, as of 2