POLYNOMIAL APPROXIMATON ANALYSIS OF SURVIVAL RATE OF PATIENTS DIAGNOSED WITH SELECTED DISEASES IN THE PHILIPPINES FROM 1960 TO 2010

THESIS

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POLYNOMIAL APPROXIMATION ANALYSIS OF SURVIVAL RATE OF PATIENTS DIAGNOSED WITH SELECTED DISEASES IN THE PHILIPPINES FROM 1960 TO 2010

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ABSTRACT

CRUZADA, REICELLE D. Polynomial Approximation Analysis of Survival Rate of Patients Diagnosed with Selected Diseases in the Philippines from 1960 to 2010. Undergraduate Thesis. Bachelor of Science in Applied Mathematics. Cavite State University, Indang, Cavite. Adviser: Mr. Michael E. Sta.Brigida.

This research study is focused on the survival rate of patients in the Philippines. This study was conducted to determine the time where the maximum and minimum values of survival rate occurred. It also aimed to interpolate the missing survival rate from 1960 to 2010. In addition, it would like to identify the rate of change and probability density function of the survival rate of patients diagnosed with selected diseases. Furthermore, this would extrapolate the survival rate for the succeeding years which are from 2011 to 2020.

This research focused on the five selected diseases which are pneumonia, tuberculosis, malaria, dengue hemorrhagic fever and influenza. These diseases are some of the notifiable diseases in the country and on the top leading causes of morbidity in the Philippines at the same time.

In this study, it was observed that the trend of the survival rate varies depending on the selected disease. Also, the maximum values of survival rate for each selected diseases occurred in the early 20^{th} century except for malaria and dengue hemorrhagic fever. On the other hand, the minimum values of survival rate occurred in the interval 1966 to 1978 for each of the designated diseases. The missing values of survival rate from 1960 to 2010 were obtained through the use of the generated piecewise interpolating polynomials. The rates of change were also identified by using interpolating

polynomials and it showed that the most fluctuating rate of change in each selected disease occurred on the first approximation model.

The probability density function that defines the survival rate of patients diagnosed with pneumonia, tuberculosis and malaria is the normal distribution while on the other hand, dengue hemorrhagic fever and influenza were fitted with an interpolating polynomial that could explain the probability of the survival rate of both diseases.

Since it was possible to generate an extrapolating polynomial that would define the survival rate of patients diagnosed with selected diseases in the succeeding years, unknown values of survival rate for the next 10 years were obtained. The extrapolated values of survival rate for pneumonia, tuberculosis and dengue hemorrhagic fever were fluctuating while the extrapolated values for survival rate of patients with malaria and influenza were increasing.

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INTRODUCTION

Filipinos are well known as one of the best healthcare workers all over the world. They contribute a lot in the medicine and health industry globally. Health care is the efforts made to maintain or restore health especially by trained and licensed professionals. Its main concern is the prevention of disease, prolonging life, promoting physical, health and efficiency through organized community efforts (Landicho, 2007).

But in spite of this global competitiveness, Philippines has a major problem in terms of its health care condition. "Only those who can afford to pay, have health care coverage. Of 100 deaths due to illness, more than seventy percent (70%) have not seen hospital facilities neither visit medical practitioners during their lifetime"(Health care of the Philippines, 2014). They cannot afford the costs of expensive treatments and