UNIVERSITI TEKNOLOGI MARA

TECHNICAL REPORT

MATHEMATICAL MODELING OF JAUNDICE USING NUMERICAL DIFFERENTIAL METHOD (EULER METHOD)

KU NUR ZULAIKHA BT KU MAHMUD
2014274158   K15/28
MAIZURAH BT MOHAMMAD
2014808112   K15/28
HANUN NASUHA BT LOP AHMAD
2014417906   K15/28

Report submitted in partial fulfillment of the requirement
for the degree of
Bachelor of Science (Hons.) Mathematics
Center of Mathematics Studies
Faculty of Computer and Mathematical Sciences

JULY 2016

ACKNOWLEDGEMENTS

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

TABLE OF CONTENTS

ABSTRACT

Jaundice is yellowing of the skin and eyes when a baby has a high level of bilirubin in the blood. It's caused by excess bilirubin damaging the brain or central nervous system. In this paper, we want to solve the mathematical model of jaundice by combining Mass Transport Model and Mass Balance Law using Euler Method. From the result, we observed how different parameters can give different solutions and which parameter are the best in simulating the system of concentration of bilirubin. From our study, we found that the concentration of bilirubin remains in danger zone for the period of over 20 hours for both parameters used and the maturity rate of 0.04 is the best parameter in simulating the system.

1. INTRODUCTION

1.1 Introduction

Hyperbilirubinemia or otherwise called jaundice is an illness that is shared in babies. Almost 60% to 70% of infant at the age of 35 to 38 weeks, have a greater risk of encountering jaundice which can either happen in premature or full-term infants (Azzuqa and Watchko, 2015). Jaundice can be separated into physiologic and pathologic. Physiologic is compassionate and mutual in normal infant, whereas pathologic jaundice causing brain damage identified as kerticterus. In this paper, we just focus on the physiologic since it is not a serious jaundice, making it simpler to evaluate the concentration of bilirubin.

Symptoms of jaundice can be recognized after three days of birth and will usually cure in two weeks time after treatment. The yellowing effect commonly spreads to the infant's skin when there is a high level of bilirubin. It starts at the face, before spreading to the stomach and also chest. Several other symptoms can also be seen such as the appearance of whitish color in their eyes, inside their mouth, on the sole of their feet, and also on the palm of their hands. Besides that, other associated symptoms of jaundice can include poor sucking during breast feeding, sleepiness, a high-pitched cry and also dark in their urine. All of these symptoms can lead to jaundice in infant.

Figure 1.1: Neonatal Jaundice