

# Abstract

In this thesis, we consider an SVEICHR model to study dynamics of HBV disease as well as to perform optimal control analysis. We determined the disease free point and endemic equilibrium point. To analyze dynamics of HBV disease, we computed the reproduction number  $R_0$  by using next generation method. We also determined the stability at equilibrium points. To control the dynamics of disease due to Hepatitis B virus, two optimal control strategies are implemented. For this, optimal control problems are constructed and Pontryagin's maximum principle is applied with a goal to put down the disease in the population. In the end, numerical solutions obtained through a Matlab code are given.