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MATHEMATICAL ANALYSIS ON THE SPREAD AND CONTROL OF GLOBAL DYNAMICS OF TOBACCO SMOKING WITH INDUCED DEATH

GETACHEW ABIYE SALILEW

Madda Walabu Universty, Department of Mathematics, Bale Robe, Ethiopia

ABSTRACT

Tobacco smoking is a series problem in the entire world. It is a bad habit widely spread and socially accepted. Many people start smoking during their adolescence or early adulthood stage. In this study we consider a deterministic compartmental mathematical model. Compartmental models in epidemiology are widely used as a means to model disease spread mechanisms and understand how one can best control the disease in case an outbreak of a widespread epidemic occurs. However, a significant challenge within the community is in the development of approaches that can be used to rigorously verify and validate these models. We classify the population in to five compartment named as potential smoker, occasional smoker, smoker, temporarily quit smoking and permanently quit smoking. Those in this compartment are not able to be infected again. We derived the formula for the basic smoking generation number which depends on six parameters and the population size $N(t)$. We present both local and global stability analysis for the smoking free and smoking present equilibria. We identify the basic control parameters give insight to give up smoking with their numerical simulation.

KEYWORDS: Tobacco Smoking, Smoking Generation Number, Five Dimensional System, Stability Analysis

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