

**A Mathematical model for motorcycle rider population total based on susceptibles,
reported and unreported accidents**

Zablon Muga

Abstract

Reports indicate that the emergence of motorcycles in the transport sector has come with both pros and cons. The rising numbers of motorcycles and the related accidents have a close association. In some previous studies, regression models have been used to show the factors that frequently contribute to motorcycle accidents. In this study, a mathematical model is proposed and solved for motorcycle rider population at a given time t , where t is defined in days. This model is based on three classes: susceptible class of riders which includes old and new riders joining the population, a second that contains the population that have caused and reported accidents and a third of unreported accidents. Three differential equations are solve numerically by the Laplace transform to obtain an overall equation from which the total rider population may be determined at any given time t in days. The results of this study are presented in graphs and are discussed.