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*Qualitative study for a vector-borne epidemic model*

Many efforts have been made trying to describe the dynamic of infectious diseases and with the intention to identify which parameters have the most epidemiological importance. We study a classical SIR-SI model for arboviruses considering a variance in the size of human population. Under this hypothesis, we developed a qualitative study of the mathematical model analysing the local and global stability of the equilibrium. The disease-free equilibrium is globally stable if  $R_0 \leq 1$  and unstable if  $R_0 > 1$ . For the endemic equilibrium we showed that if  $R_0 > 1$  then this equilibrium is globally stable. The results of the global stability were verified by using the Poincaré Bendixson criterion for competitive systems. Finally we take a sensitivity analysis with the aim to identify the most important parameters in the disease's spread through the  $R_0$  parameter, and the prevalence of the disease through the endemic equilibrium sensitivity. We found that the bite rate and the mortality rate of the vector are the most sensitive parameters.