

First Joint Meeting Brazil Italy of Mathematics Special Session: Analytical and Numerical Aspects of Modeling Biological Systems

Rio de Janeiro, August 29 - September 02, 2016

Title: Zika epidemy: how to avoid an endemic situation.

Authors: Souza, Juliana M. R., Miyaoka, Tiago Y., Meyer, João F. C. A., Barros, L. C.

Abstract: Zika virus is a serious worldwide concern nowadays, due to also to microcephaly in babies born from mothers that have been infected during pregnancy. The disease vector, the aedes aegypt mosquito, is also the vector responsible to the spread of chikungunya and dengue, this last with a considerable mortality rate in Brazil. In this work, a compartmental SIS mathematical model is considered, with logistic growth for the insect population. The infection rate takes into account the vector growth and activity relevance. A stability analysis of the system's equilibria points is undertaken by means of a Monte Carlo generation of the model's parameters and its statistical analysis. These results indicate that the endemic equilibrium is stable in 25% of the cases and, moreover, there is a -0.9 correlation between the intrinsic reproduction rate of the population and one of the negative eigenvalues corresponding to this equilibrium point. Therefore, the authorities' recommendation, is that of trying to avoid pregnancy at this time, leads to a possible, albeit partial, control strategy, not only in reducing microcephaly cases but, also, in the sense of abringing about a significant delay in this disease's spread and influence.