

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

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**Title:** Mathematical Modeling of the Control of *Aedes aegypti* with the Introduction of Wolbachia Contaminated Male Mosquitoes

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**Abstract:** Mosquitoes of the *Aedes* gender, popularly known as dengue mosquitoes, are the vectors of seven diseases: 4 types of dengue fever, chikungunya, zika and yellow fever. The main vector of these diseases is the *Aedes aegypti*, whose life cycle can be divided into two stages: the aquatic phase and the terrestrial (winged) phase. We propose a mathematical model with a control that consists in the introduction of mosquitos contaminated with the Wolbachia bacteria, which is found in about 70% of the insects in the natural environment. The proposed model is based on ordinary differential equations that represent the mosquitoes dynamics both in the aquatic and winged phases, as well as the interactions between male and female insects, contaminated or not.

*Keywords:* *Aedes aegypti*; Wolbachia; Mathematical Programming