A Versatile Algorithm to Propose Optimized Solutions to the Dengue Disease Problem

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Abstract : Dengue is a febrile infectious disease caused by a virus of the family Flaviridae. It is transmitted by the bite of mosquitoes, usually of the genus Aedes aegypti. It occurs in tropical and subtropical areas of the world. This disease has been a major public health problem worldwide, especially in tropical countries such as Brazil, and its incidence has increased in recent years. Dengue is a subject of intense research. Efficient forms of mosquito control must be considered. In this work, the mono-objective optimal control problem was solved for analysing the dengue disease problem. Chemical and biological controls were considered in the mathematical aspect. This model describes the dynamics of mosquitoes in water and winged phases. We applied the genetic algorithms (GA) to obtain optimal strategies for the control of dengue. Numerical simulations have been performed to verify the versatility and the applicability of this algorithm. On the basis of the present results we may recommend the GA to solve optimal control problem with a large region of feasibility.

Keywords : genetic algorithm, dengue, Aedes aegypti, biological control, chemical control

Conference Title : ICMB 2014 : International Conference on Mathematical Biology

Conference Location : Barcelona, Spain

Conference Dates : October 27-28, 2014