Models of mosquito population control strategies for fighting against arboviruses

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Résumé

In the fight against vector-borne arboviruses, an important strategy of control of epidemic consists in controlling the population of the vector, Aedes mosquitoes in this case. Among possible actions, two techniques consist either in releasing sterile mosquitoes to reduce the size of the population (Sterile Insect Technique) or in replacing the wild population by one carrying a bacteria, called Wolbachia, blocking the transmission of viruses from insects to humans. This talk is devoted to studying the issue of optimizing the dissemination protocol for each of these strategies, in order to get as close as possible to these objectives. Starting from a mathematical model describing population dynamics, we will study the control problem and introduce the cost function standing for population replacement and sterile insect technique. Then, we will establish some properties of the optimal control and illustrate them with numerical simulations.

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