Models of mosquito population control strategies for fighting against arboviruse

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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, a technique consist in releasing sterile mosquitoes to reduce the size of the population (Sterile Insect Technique). 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 the dynamic of a mosquitoes population, we will study the control problem and introduce the cost function standing for sterile insect technique. In a second step, we will consider a model with several patchs modeling the spatial repartition of the population. Then, we will establish some properties of these two optimal control problems. Finally, we will illustrate our results with numerical simulations.

[1] L. Almeida, M. Duprez, Y. Privat, N. Vauchelet. *Optimal control strategies for the sterile mosquitoes technique*. Journal of Differential Equations, **311**, 229–266, 2022.

[2] Y. Dumont, M. Duprez, Y. Privat. *Impact of patches connection on optimal population sit control*. in preparation, 2022.

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