Effectivity of the vaccination strategy for a fractional-order discrete-time SIC epidemic model

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Abstract

In this paper, we apply the vaccination control strategy to the fractional-order discrete-time SIC epidemic model given in [1]. We use two different scenarios. The first one takes into account the initial variables and involves new parameters related to vaccination and its effectiveness in preventing contagion. In the second scenario, we add a new variable to the model representing the vaccinated individuals. For both cases, the basic reproductive number is obtained to study the behaviour of the disease. However, the main aim of the paper is to analyse the effect of the different parameters on the evolution of the disease when we use vaccination as a control strategy to relieve a certain indirectly transmitted disease. A quantitative relationship would allow us to relate this strategy with the reduction of the burden of the disease. The sensitivity indexes [2] will help to study this effect and will be useful to relate the efficiency with the cost-effectiveness of the vaccination strategy when reducing the impact of the disease. The obtained results will be applied to an epidemiologic process developed in a pig farm.

References

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