POSTER

Literature review on epidemiological models with spatial dependence with Lagrangian approach

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Abstract

Classical epidemic models are generally described by compartmental models that do not include spatial heterogeneity. There are mainly two distinct approaches to include spatial dependence that we will designate by Eulerian and Lagrangian approaches, following the notation suggested by [1]. In the Eulerian approach, we follow the movement of individuals, assuming that the contacts are local. In the Lagrangian approach, we follow the individuals' contacts and not their movement. Thus, at each point in space, those infected result from contact between individuals belonging to different locations, but the individuals remain in the same place. Both these approaches can be implemented in discrete space using compartmental models or in continuous space, with integral-differential or with diffusion models. In our work, we will focus on the Lagrangian models.

We will present the results from our literature review on epidemiological models with Lagrangian approach. We identified several discrete models, and continuous models, using reaction-diffusion models [2] and integro-differential models [3]. In the continuous context, these models are also referred to as Distributed-Contact Models (DC models), as opposed to the Distributed-Infected Models (DI models). We will describe the main results obtained by the authors, focusing on stability results of the disease-free and endemic equilibria and on the definition of the basic reproduction number.

In future work, we intended to study these models and generalize the results to other operators.

Keywords Spacial models, integro-differential models, basic reproduction number, stability analysis

References

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