Parametric dynamic systems as appoximations to epidemic processes.

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A discrete dynamical model with stage structure is considered. In particular the model represents the relationship between population distribution and disease spread. In this model we consider a population with stage structure. It is divided in three stages: immature individuals, susceptible mature individuals and infectious nature individuals, and it is considered the gender in each stage.

To construct the model it is reasonable to assume that a person is susceptible to be infected after contact with infective persons and recovery from disease does not permanent immunity. Moreover, infected individuals can not reproduce. For that, only the mature individues can reproduce in which the birth rate of mature population depends on the non infected woman population. These assumptions lead to a parametric discrete time system.

Usually, the model is constructed using some of the properties of the epidemic process by tinkering with adjustable parameters. Hence the equations of the model involved unknown parameters. In this case, it is interesting to obtain these parameters to accurate the model. Thus, the first step in our work is to study if the unknown parameters can be identified uniquely from the experiment considered.

It is known that from a biological point of view, it is necessary that the system has a equilibrium state in the positive orthant. Hence, the our second step it is shown that the considered epidemic model has a stable positive equilibrium.

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