

Investigation of inference precision for epidemic models

One of the simplest epidemic models is called the Reed-Frost model. There, in any transmission generation, an infective infects a susceptible with probability p , and a susceptible escapes infection if he/she escapes infection from all infected. In the project we will look at two scenarios for making inference: either we observe the final size, meaning that we observe how many were infected during the epidemic outbreak, but not in which generation. The second set of data is more detailed in that we also observe in which generation each individual got infected. The question is how much is gained from the latter more detailed data as compared to the first. The same question will be addressed also for household epidemics, where there is increased risk of transmission between household members.

The project will involve both learning some theory for epidemic models and to numerically maximize the complicated likelihood. Since no specific data is in mind it will also involve simulation of outbreaks from the model.

Suitable skills include Markov process theory, likelihood theory and programming skills.

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