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Spatial Approximations of Network-based Individual Level Infectious Disease Models

Often, when modeling infectious disease spread, the complex network through which the disease propagates is approximated by simpler spatial information. Here, we simulate epidemic spread through various contact networks and fit spatial-based models in a Bayesian framework using Markov chain Monte Carlo methods. These spatial models are individual-level models which account for the spatio-temporal dynamics of infectious disease. The focus here is on choosing a spatial model which best predicts the true probabilities of infection, as well as determining under which conditions such spatial models fail.