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Analyzing the UK 2001 foot-and-mouth disease outbreak using stochastic graph models

In recent decades stochastic graphs have been used in many fields to explain the evolution of a set of random objects (vertices),along with a relationship structure (edges). We consider statistical inference in a dynamic random graph, in the absence of edge information. It is shown that the dynamic behavior of the graph, accompanied with the vertex information is a useful in making inference about the edges. The problem is motivated by the foot-and-mouth disease (FMD) outbreak in the UK in 2001. A stochastic Euclidean graph model with Markov property, is introduced to model this epidemic. In addition, it is shown that the existing information, is sufficient to draw inference about the model and hence the missing edges.