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Turing Theory in an Epidemiological Model

Spatial models quantify disease spread in terms of epidemiological parameters (infection and recovery rates) that influence the speed of disease propagation *traveling epidemic fronts*. A recurrent assumption behind both type of models is uniformity in disease propagation. Such an assumption while unrealistic facilitates the mathematical analysis. In this dissertation the assumption of uniform mixing (*homogeneity*) is relaxed, spatial heterogeneity in the transmission process is allowed.

A novel reaction diffusion model is introduced and used to identify necessary and sufficient conditions for the aggregation of individuals that may result in response to the introduction of a communicable disease. The methodology and techniques used in the analysis of this model, which exhibits diffusive instability, include Turing theory, which as far as I know, has not been used in this context.