

Abstract

Agent-based modelling is a technique to study complex collective behaviour through a ground-up approach and is much closer to real-world modelling than other techniques that exist. In this thesis, I have attempted to show the similarities and differences in dynamics that the micro modelling approach of Agent-based modelling and the macroscopic technique of differential equation modelling show. Comparative studies have been done on Lotka-Volterra Prey-Predator systems and Epidemiological models of SI and SIS types. The observations from the Agent-based approach have been compared with the differential equation models, and information like the probability of different type of dynamics including rare events to properties emerging out of the spatial distribution of the heterogeneous agents were studied. In the case of epidemiological models, the effect of boundaries on time taken for infection spread has also been studied to understand the method of quarantining within the space during disease spread.