

APPLIED MATHEMATICS COLLOQUIUM

Date: Wednesday, February 3, 2016

Time: 2:30 – 3:30 p.m.

Location: Middlesex College Room 204

On Asymptotic Profiles of The Steady States for a Diffusive SIS Epidemic Model with Mass Action Infection Mechanism

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Abstract:

Mass action and standard incidence are two major infection mechanisms in modelling spread of infectious diseases. By analyzing a diffusive SIS model with the standard incidence infection mechanism, some recent works have investigated the asymptotic profiles of the endemic steady state as the diffusion rates approaches zero, and the results show that controlling the diffusion rate of the susceptible individuals can help eradicate the infection, while controlling the diffusion rate of the infectious individuals cannot. This paper aims to reveal the difference between the two infection mechanisms in a spatially heterogeneous environment. To this end, we consider a diffusive SIS model of the same structure but with the mass action infection adopted, and explore the asymptotical profiles of the endemic steady state for small and large diffusion rates. It turns out that new model poses some new challenges due to the nonlocal term in the equilibrium problem. Our results on this new model reveal some fundamental differences between the two transmission mechanisms in such spatial models, which may provide some implications on disease modelling and controls.