

ASYMPTOTIC PROFILES OF THE ENDEMIC EQUILIBRIUM TO A DIFFUSIVE SIS EPIDEMIC MODEL WITH MASS ACTION INFECTION MECHANISM

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ABSTRACT. In this paper, we are concerned with the endemic equilibrium to a diffusive SIS epidemic model with mass action infection mechanism. Under much weaker assumptions, we determine the asymptotic profile of the endemic equilibrium as the diffusion rate d_S of the susceptible population goes to zero. In one space dimension, we also discuss the asymptotic profile of the endemic equilibrium as the diffusion rate d_I of the infected population goes to zero. Our theoretical analysis shows that the infectious disease still exists in the above two situations, and such behaviors are very different from that of other SIS epidemic systems. Our first result essentially improves the main ones of Wu and Zou (J. Differential Equations, 261(2016), 4424-4447), and in one space dimension our second result solves an open problem left there.

Keywords. SIS model with mass action infection mechanism; endemic equilibrium; small diffusion; asymptotic profile.

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