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Global dynamics of an advective Lotka-Volterra competition-diffusion system

This talk is based on the Joint works with Professor De Tang. We consider a Lotka-Volterra competition-diffusion model in a one-dimensional advective environment. The two species are assumed to have the same population dynamics and advective rates but different diffusion rates. Moreover, the upstream end is supposed to be Neumann type boundary condition and the downstream end has a net loss of individuals measured by b. In the homogeneous case, if $0 < b < 1$, then the faster diffuser wins; if $b > 1$, then the slower diffuser wins (if it exists); and if $b = 1$, there is a compact global attractor consisting of a continuum of steady states. For the heterogeneous case, it is shown that the species with slower diffusion rate (if it exists) is always selected when $1 \leq b \leq \infty$.