Applied Dynamical Systems Seminar

Dr. Peng Zhou
Memorial University

Wednesday, November 2, 2016
2:00p.m., HH-3017

Evolution of Dispersal Strategy in Advective Heterogenous Environments

Abstract:

In this talk, we focus on a competition-diffusion-advection model from river ecoloy to address the evolution of dispersal strategy in advective heterogeneous environment. More specifically, we suppose that two populations are competing for the same resources but adopting different dispersal strategies, as reflected by their diffusion and/or advection rates. By using the theory of monotone dynamical systems and some analytic skills, we get qualitative understanding of the population dynamics. It turns out that when the resource function is decreasing in spatial variable, the competitive exclusion principle holds under a mild assumption on the diffusion and advection rates, and different phenomena may occur if this assumption is violated; when the resource function is increasing, co-existence is possible. A complete understanding is achieved when the dispersal strategies of two competitors are proportional, regardless of the monotonicity of the resource function. These results indicate that the mechanism behind the evolution of dispersal strategy in heterogeneous environment is more complicated than that in the homogeneous case.