YURIJ SALMANIW, University of Alberta

Habitat Loss: Bridging the gap between habitat degradation and habitat destruction in a competitive reaction-diffusion system

In this talk I will introduce a diffusive competition model with habitat degradation and homogeneous Neumann boundary conditions in a bounded domain that is partitioned into the healthy region (undisturbed habitat) and the degraded region (due to anthropogenic habitat disturbance). Species follow the Lotka-Volterra competition in the healthy region while in the degraded region species experience only exponential decay (not necessarily at the same rate). Using theory from monotone dynamical systems and other related results, a complete description of the global dynamics will be presented. I will then introduce a habitat destruction problem and make rigorous the connection between these two formulations. It is found that the destruction problem can be viewed as a limiting case of the degradation problem. This requires some interesting convergence results between two eigenvalue problem formulations and the related scalar equation, which in turn provides significant insight into the destruction competition system. I will conclude with some future directions currently being investigated.