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Global dynamics of a diffusive competition model with habitat degradation

It is well known that habitat loss is one of the major contributing factors to the decline of biodiversity worldwide. Partial differential equations offer one method to study the effects of habitat loss on competing species in a spatially explicit setting. Often, we identify three primary forms of habitat loss: degradation, destruction, and fragmentation. In this talk, I will introduce a diffusive competition model subject to habitat degradation and discuss the global dynamics for differing parameter regimes. In the model, the domain (habitat) 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 each population experience only decay in the degraded region (not necessarily at the same rate). It is shown that for differing parameter regimes, the competitive exclusion of each species is possible, and moreover there always exists a regime admitting coexistence. I will then briefly discuss the next stages of this project with connections to a habitat destruction problem and the question of fragmentation.