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*Eigenvalues in domains with holes: a reaction-diffusion equation approach to habitat fragmentation*

The impacts of habitat loss, through habitat degradation and destruction, are well documented and have an undeniable influence on the sustainability of ecosystems. What is less clear, however, is the role habitat fragmentation plays and its relative impact on biodiversity. In this talk, I will explore some of the preliminary results obtained relating to changes in the size of a principal eigenvalue in relation to configurations of bad habitat in a bounded domain. First, I will briefly discuss some strong motivation from recent habitat degradation and destruction models introduced in a competition-diffusion setting. In these models, a primary tool used to determine the global dynamics is the study of a relevant eigenvalue problem obtained through a linearization about the trivial steady state. Then, the question of fragmentation is directly, and quite naturally, related to the configuration of good and bad regions of habitat within a single bounded domain: hence the study of an eigenvalue problem in a domain with holes. I will then conclude with some open questions and future directions for this project.