

Spectral Expansion in Metapopulation Models with Different Time Scales

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Understanding the effects of spatial and temporal heterogeneity on population dynamics is crucial in ecological and epidemiological modeling. In this talk, we explore the application of spectral expansion and group inverses to quantify and analyze variability in population persistence, growth rates, and disease invasibility when different time scales are present. By leveraging this mathematical framework, we examine how habitat heterogeneity, resource distribution, and migration patterns influence population stability and resilience. Our approach provides novel insights into the role of environmental variability in shaping long-term population outcomes, with implications for conservation strategies, ecological management, and infectious disease prevention.

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