

Master's Thesis Outline

Title: Study and application of metapopulation ecological models

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Abstract:

Currently, ecological models have deepened our understanding of population dynamics, with Lotka-Volterra models being fundamental in describing species interactions. However, the complexity of many real ecosystems requires incorporating spatial dimensions and connectivity between different patches, which is addressed through the metapopulation model framework. This extension is especially relevant for interpreting diverse situations such as the role of the appendix in the gut microbiome as a microorganism reservoir during disturbances, the influence of habitat connectivity on landscape biodiversity, the variability of tissue microbiomes (e.g., in fish) linked to their environmental connection, and the dynamics of planktonic communities, where flow and dispersion are determining factors.

In this work, we propose an analytical and computational study of generalized Lotka-Volterra models in their metapopulation version and their application to scenarios representing real cases.