

# A tour of the Generalized Lotka-Volterra Model

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The Generalized Lotka-Volterra model is one of the oldest and most studied models for species interactions, and plays a paramount role in our understanding of community ecology, coexistence theory, and population dynamics. Despite its long history, many of the mathematical aspects of the model are not often presented to graduate students, and its connections with ecological data have rarely been drawn. In this series of lectures, I will briefly recap the history and structure of the model, show its connections to other important models in ecology (SIS/SIR models, metapopulation models, replicator equation), and outline its dynamics. I will then focus on how can we relate the GLV model to important problems in ecology: predicting coexistence and abundance in experimental communities, understanding biodiversity-ecosystem functioning experiments, and forecasting population dynamics. The focus will be on highly speciose communities, with forays into random matrix theory and its applications to ecology.