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Hierarchical Ordination

Ordination methods have been used by community ecologists to describe and explore the communities they sample by reducing this variation down to a small number of dimensions. More recently, Joint Species Distribution Models have been developed to model and predict the distributions of several species simultaneously. Contemporary models for the data for both of these problems are essentially the same: Generalised Linear Latent Variable Models (GLLVMs).

We have been developing extensions to GLLVMs where we model the latent variables themselves. Here we propose hierarchical ordination: a unified approach to this, which incorporates several current models. The innovation is to model both the latent variables and species scores as functions of the environment and of species' traits. This has the potential to simplify the models, and still help to solve ecological problems such as the fourth corner problem, and having correlations between species depend on the environment.

We will describe the hierarchical ordination framework, and show how these models can be used in practice.