GENERALIZED LINEAR LATENT VARIABLE MODELS IN THE ANALYSIS OF MULTIVARIATE ABUNDANCE DATA

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In many ecological studies, abundances of interacting species are collected from several sites. Such data are often very sparse, high-dimensional and include highly correlated responses, and the main aim of the statistical analysis is to understand relationships among such multiple, correlated responses. We consider model-based approaches for analyzing multivariate abundance data. We will show how generalized linear latent variable models (GLLVMs) can easily capture the correlation inherent in responses and provide a powerful tool for estimation and inference. Fast and efficient maximum likelihood based algorithms for fitting the models will be discussed. It is shown that especially variational approximation method performs better than several classical estimation methods for GLLVMs. The methods will be applied to ecological datasets.