

EDGE EXCHANGEABLE RANDOM GRAPHS AND THE UNSEEN SPECIES PROBLEM

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Edge exchangeable random graphs are a class of increasing graph-valued stochastic processes which have a law that is invariant under permutation of the order of arrival of the edges. The unseen species problem asks one to predict, given some iid samples from a distribution over symbols (species), how many never before seen species will be seen if one moderately enlarges the sample. Such questions arise frequently in practice, especially in ecology where the related estimators are key to estimating ecological diversity. We will explain how the unseen species with dependent data may naturally be associated with the vertex set of an exchangeable random graph and that this perspective allows one to give performance guarantees on the Good Toulmin estimator for dependent data.