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REPARAMETRIZING THE TWO-PARAMETER GNEDIN-FISHER PARTITION MODEL IN A BAYESIAN PERSPECTIVE

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ABSTRACT

In modern Bayesian statistics exchangeable Gibbs partitions (Gnedin and Pitman, 2006), are playing a central role both in the construction and properties of almost surely discrete nonparametric priors and in the nonparametric treatment of species sampling problems. Here, by means of an alternative parametrization of the two-parameter Gnedin-Fisher species sampling model (Gnedin, 2010), a family of Gibbs partitions arising by mixtures of Fisher's models, we obtain additional results for the partition model itself and a posterior analysis in a Bayesian nonparametric perspective. In particular, identifying the prior mixing distribution on the number of blocks with the shifted generalized Waring distribution (a family of probability laws arising by Beta mixtures of Negative Binomial distributions), we provide a direct construction of the exchangeable partition probability function, obtain the coniugate posterior mixing, and derive the structural distribution and its moments. On the Bayesian side, in the spirit of Lijoi et al. (2008), we provide distributional results for an additional sample, conditional on a basic observed sample, for quantities of statistical interest in species sampling problems.

Classification JEL: *C11, C14, C46*
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