From Neutrality to Parameter Independence - A Tale on Dirichlet Distributions

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Abstract

Different versions of independence properties of the classical Dirichlet distribution can be unified under the common notion of neutrality with respect to partitions. Some of such neutrality properties lead to characterizations. An important generalization of the Dirichlet law in the context of discrete Bayesian graphical is the hyper-Dirichlet distribution. This distribution, as well as its natural generalization: P-Dirichlet (introduced recently) can also be characterized in the Bayesian setting through neutrality-like properties called local and global independence of parameters. More on these theme can be found in:

1. Bobecka, K., Wesołowski, J. (2009), Moments approach to characterizations of Dirichlet tables through neutralities. Publicationes Mathematicae Debrecen 74/(3-4), 321-339.

2. Sakowicz, A., Wesołowski, J. (2014), A characterization of the Dirichlet distribution through neutrality with respect to two partitions. Journal of Multivariate Analysis 129, 1-15.

3. Massam, H., Wesołowski, J. (2015), A new prior for discrete DAG models Markov with respect to a restricted set of directions. Annals of Statistics in press.