Exponential Functional and Means of Neutral to the Right priors*

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Abstract

The mean of a random distribution chosen from a Neutral to the Right (NTR) prior can be represented as the exponential functional of an Increasing Additive Process. This fact is exploited in order to give sufficient conditions for the existence of the mean of a NTR prior and for the absolute continuity of its probability distribution. Moreover, expressions for its moments, of any order, are provided. For illustrative purposes we consider a generalization of the NTR prior based on the Gamma process and the beta-Stacy process. Finally, by resorting to the maximum entropy algorithm, an approximation to the probability density function of the mean of a NTR prior is obtained. The arguments are easily extended to examine means of posterior quantities. The numerical results obtained are, then, compared to those yielded by the application of some well-established simulation algorithms.