FLORIAN MAIRE, Université de Montréal
Weak Peskun ordering for approximate MCMC comparison

Despite the popularity of Markov chain Monte Carlo methods (MCMC) in Bayesian statistics and elsewhere, very few tools are available to establish a theoretical comparison between two (or more) competing MCMC algorithms. The Peskun ordering (Peskun, 1973) is well known for achieving this task. However, showing that a Markov kernel dominates another one (in the Peskun sense) is usually a strenuous exercise and since the Peskun ordering is only a partial ordering, two kernels need not be ordered. In this work, we propose a weaker version of the Peskun ordering which is more widely applicable and easier to establish, and this, at the price of giving only approximate comparison results. This weak Peskun ordering is applied to give elements of answers to two recent questions in the MCMC literature, namely when does a non-reversible Metropolis random walk dominate a reversible one and when does a locally-weighted Gibbs sampler dominate a random-scan Gibbs sampler.