

## Shift and Scale Coupling Methods for Perfect Simulation

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### Abstract

The development and application of algorithms that enable “perfect” sampling of the invariant measure of a Markov chain, following work in the seminal 1996 paper of Propp and Wilson, provides an important and ever growing set of tools for simulation approaches to inference. Given the availability of recent Markov chain Monte Carlo methodology, which allows many problems of interest in Bayesian and frequentist settings to be couched in terms of such invariant measures, perfect sampling is of particular interest in a statistical context.

These perfect simulation, or “coupling-from-the-past” algorithms rely on the investigators ability to couple sample paths of a Markov chain. This is often a non-trivial task, and, in the case of a continuous state space, it may depend, for example, on the development of tedious minorization conditions. As an alternative, in this talk we describe and develop a variation on a layered multishift coupler due to Wilson that allows one to obtain potentially common draws from two different distributions. The coupler is based on slicing density functions and we describe a “folding” mechanism as an attractive alternative to the accept/reject step commonly used in slice sampling algorithms. Applications will be given to storage models and model selection.