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Mark L Huber* (mhuber@cmc.edu), Dept. of Mathematics and Computer Science, Claremont McKenna College, 850 Columbia Avenue, Claremont, CA 91711. *Spatial Birth-Death-Swap Chains.*

Markov chains have long been used for generating random variates from spatial point processes. Broadly speaking, these chains fall into two categories: Metropolis-Hastings type chains running in discrete time and spatial birth death chains running in continuous time. These birth death chains only allow for removal of a point or addition of a point. In this work it is shown that the addition of transitions where a point is moved from one location to the other can aid in shortening the mixing time of the chain. Here the mixing time of the chain is analyzed through coupling, and use of the swap moves allows for analysis of a broader class of chains. Furthermore, these swap moves can be employed in perfect sampling algorithms via the dominated Coupling from the Past procedure of Kendall and Møller. This method can be applied to any pairwise interaction model with repulsion. In particular, an application to the Strauss process is developed in detail, and the swap chains are shown to be much faster than standard birth death chains. (Received September 20, 2009)