1054-60-119   **Mark L. Huber*** (`mhuber@cmc.edu`), Claremont McKenna College, 850 Columbia Avenue, Claremont, CA 91711. *Simulation reductions for the Ising model.*

Polynomial time reductions between problems have long been used to delineate problem classes. Simulation reductions also exist, where an oracle for simulation from a probability distribution is employed together with an oracle for Bernoulli draws to obtain a draw from a different distribution. An example is the Ising model, which has several different characterizations, including the random cluster view and the spins view. The well-known Swendsen-Wang algorithm gives simulation reductions from random clusters to spins, and from spins to random clusters. Here a third characterization of the Ising model called the subgraphs view is considered. In this work it is shown how to draw a subgraphs state given a random cluster state, and a random cluster state given a subgraphs state. This answers a long standing question of whether such a direct relationship between the subgraphs view and other versions of the Ising model existed. Moreover, these reductions result in the first method for perfect simulation from the subgraphs world and a new Swendsen-Wang style Markov chain for the Ising model. The method used is to write the desired distribution with set parameters as a mixture of distributions where the parameters are at their extreme values. (Received September 09, 2009)