

An important property of discrete-time Markov chains with finite state space is the rate of convergence of the marginal distribution of the chain to the stationary distribution (i.e. mixing rate). If we construct a coupling of two Markov chains with the same transition matrix, where one starts from a stationary distribution and the other from a fixed state, we can use it to estimate the mixing rate. The main goal of this thesis is to describe how we can construct such a coupling using the transportation metric, and to apply this method to approximate counting of all proper colorings of the graph.