

Convergence of the marginal distribution of a Markov chain to its stationary distribution is an essential property of this model with many applications in different fields of modern mathematics. Such typical applications are for example the Markov Chain Monte Carlo algorithms, which are useful for sampling from complicated probability distributions. A crucial point for usefulness of such algorithms is the so called mixing time of corresponding Markov chain, i.e. the number of steps the chain has to make for the difference between its current marginal distribution and stationary distribution to be sufficiently small. The main goal of this thesis is to describe a method for estimation of the mixing time based on a probability technique called coupling. In the first part we collect some definitions and propositions to show how the method works. Later the method is demonstrated on several traditional examples of Markov chains including e.g. random walk on a graph. In the end we study Metropolis chain on the set of proper colorings of a graph as a specific example of MCMC algorithm and show how to estimate its mixing time.