

# Almost sure convergence rates of adaptive increasingly rare Markov chain Monte Carlo

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We consider adaptive increasingly rare Markov chain Monte Carlo (MCMC), which is an adaptive MCMC method, where an adaptation concerning the “past” takes place less and less often over time. We investigate the convergence behaviour of renormalised Monte Carlo sums and show limit theorems which hold under a Wasserstein contraction assumption. Our results hold in an almost sure setting and we obtain rates which are close to those in a law of the iterated logarithm. As a consequence we are able to deduce a quantitative strong law of large numbers for the adaptive increasingly rare MCMC path average estimator.