

# MCMC convergence bounds for reversible chains

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## **Abstract**

Many MCMC algorithms converge at an exponential rate. In this talk I will discuss an approach which can bound this rate explicitly, guaranteeing that the Markov chain (nearly) converges within a certain number of steps. The two necessary ingredients are (1) a regenerative structure, which can be proved using a "drift-and-minorization" condition, and (2) an aperiodicity property. The resulting bounds are best for reversible chains with nonnegative spectrum, since these display no periodic behaviour. Such chains have a close relationship between the frequency of regeneration and the rate of convergence. I will explain this relationship using the notion of "strong random times," which are a variant of regeneration times, and test out the whole theory by applying it to a toy MCMC example.