

GEOMETRIC CONVERGENCE OF THE METROPOLIS–HASTINGS SIMULATION ALGORITHM

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ABSTRACT. Necessary and sufficient conditions for geometric convergence of the Metropolis–Hastings simulation algorithm with a general generation function are established. If these conditions are violated, then the algorithm does not in general converge. An explicit expression for the convergence rate is found. The convergence rate depends heavily on the size of the domain where the generation function is positive, a lower bound of the ratio between the generation function and the limiting function in this domain and the number of jumps necessary to jump between two arbitrary states. The results in the paper also give a qualitative understanding of the convergence rate.

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Date: December 17, 1996.

1991 Mathematics Subject Classification. 60J27.

Key words and phrases. Markov chain Monte Carlo, Metropolis–Hastings algorithm, convergence.

Research supported by Research Council of Norway.