GEOMETRIC CONVERGENCE OF THE METROPOLIS–HASTINGS SIMULATION ALGORITHM

LARS HOLDEN

NORWEGIAN COMPUTING CENTER AND UNIVERSITY OF OSLO

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.

NORWEGIAN COMPUTING CENTER
P.O. BOX 114 BLINDERN
N-0314 OSLO
NORWAY
E-MAIL:LARS.HOLDEN@NR.NO