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We consider Markovian models on graphs with local dynamics. We show that, under suitable conditions, well-behaved functions of the state of such a Markov chain at time  $t$  exhibit strong concentration of measure. We discuss how this can be used to prove a law of large numbers for a sequence of Markov chains. Also, we consider chains that exhibit both rapid convergence to equilibrium and strong concentration of measure in the stationary distribution.

We illustrate our results with applications to some known chains from computer science and statistical mechanics. (Received March 01, 2009)