

On asymptotic behavior of a finite Markov chain

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Abstract

We consider a finite nonhomogeneous Markov chain with transition matrices $(P_n)_{n \geq 1}$ such that $\lim_{n \rightarrow \infty} P_n = P$, where P has $p \geq 1$ irreducible and aperiodic closed classes and, perhaps, transient states. We give sufficient conditions for uniform weak and uniform strong ergodicity and convergence, respectively, of the nonhomogeneous chain in terms of similar properties of a nonhomogeneous Markov chain of smaller size. We show the dependence of long-run behavior of $(P_n)_{n \geq 1}$ on spectral properties of the matrix P and on the nature of the perturbations $V_n = P_n - P$, $\forall n \geq 1$. Our conditions are compared to some other results existing in literature. Markov chains of this type occur in simulated annealing, a stochastic algorithm for global optimization.

References

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