Markov chains in stationary and ergodic random environment

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Markov chains in stationary random environments (MCREs) with a general (not necessarily countable) state-space appear in several branches of applied probability including mathematical finance, queuing models with non-i.i.d. service times and statistical learning theory. Assuming suitable versions of the standard drift and minorization conditions, we prove the existence of limiting distributions for MCREs in cases when the system dynamics is contractive on the average with respect to the Lyapunov function and large enough small sets exist with large enough minorization constants. We also establish that a law of large numbers holds for bounded functionals of the process. Applications to queuing systems and to machine learning algorithms are also presented.