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Asymptotic properties of some non-Markovian stochastic processes

We study the limit behavior of certain classes of dependent random sequences (processes) which do not possess the Markov property. We remark the differences between the Markovian and our problem. Assuming the dependence of the non-Markovian processes depend on a control parameter we show that the optimization of the control can be reduced to a problem of nonlinear optimization. Under certain hypotheses we establish the stability of such optimization problems.