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Efficiency of Monte Carlo Integration using Markov Chains

We investigate the efficiency of numerical integration based on Markov chains. We determine how the loss of efficiency compared to independent sampling depends on spectral properties of the underlying Markov chain. This is done for discrete and non–discrete state spaces. Then we discuss how variance reduction improves efficiency. As an application we exhibit the convergence of Metropolis samplers towards their invariant distribution in dependence of the distance of this to the uniform one.