EXACT ESTIMATION VS EXACT SIMULATION

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Exact simulation (or perfect simulation) of Markov chains has been an active area of research since the early 1990s. The goal of an exact simulation algorithm is to generate, in finite time, a sample from the stationary distribution of the Markov chain, based only on the ability to simulate the dynamical behavior of the chain. While exact simulation can be implemented in many interesting examples, there is no known algorithm capable of implementing exact simulation without imposing strong conditions on the underlying chain. In this talk, we discuss how relaxing the problem to one of exact estimation makes this problem much more tractable. An exact estimation algorithm focuses on constructing unbiased estimators for functionals of the stationary distribution, rather than insisting on sampling from the stationary distribution itself. With this relaxation in place, we describe how exact estimation can be implemented for Harris recurrent Markov chains and non-Harris recurrent contracting chains.