Efficient Simulation via Coupling

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This paper is concerned with how coupling can be used to enhance the efficiency of a certain class of terminating simulations, in Markov process settings in which the stationary distribution is known. We are able to theoretically establish that our coupling-based estimator is often more efficient than the naive estimator. In addition, we discuss extensions of our methodology to Markov process settings in which conventional coupling fails and show (for Doeblin chains) that knowledge of the stationary distribution is sometimes unnecessary.