

Array-RQMC for Markov Chains with Random Stopping Times

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Abstract Array-RQMC is a randomized quasi-Monte Carlo (RQMC) method designed to estimate the distribution of the state of a discrete-time Markov chain at each step, and/or the expectation of a smooth cost function of the sample path of that chain, with better accuracy than standard Monte Carlo for an equivalent number of sample paths. Previous experiments have shown that the method can be very effective to estimate an expectation that depends on the state at a fixed step number, and linear combinations of such expectations. Here we test the effectiveness of the array-RQMC method in situations where the cost is a function of the state at a random stopping time. This occurs for example in optimal stopping problems such as the pricing of American-style options by Monte Carlo methods, and in the evaluation phase of a fixed stopping policy. The method still provides an unbiased estimator of the expected cost in that case, but we find that the variance reduction with respect to standard Monte Carlo is usually not as impressive when the stopping times differ for the different realizations of the chain compared with the case where all stopping times are equal. We explain why.

1 Introduction

The remainder is organized as follows. In Section 2, we recall basic definitions and known results on the array-RQMC method ...

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2 Array-RQMC for Markov Chains

3 Example:

4 Example:

5 Future Work and Conclusion

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References