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Least Squares Monte Carlo applied to Dynamic Monetary Utility Functions

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Abstract

In this paper we explore ways of numerically computing recursive dynamic monetary risk measures and utility functions. Computationally, this problem suffers from the curse of dimensionality and nested simulations are unfeasible if there are more than two time steps. The approach considered in this paper is to use a Least Squares Monte Carlo (LSM) algorithm to tackle this problem, a method which has been primarily considered for valuing American derivatives, or more general stopping time problems, as these also give rise to backward recursions with corresponding challenges in terms of numerical computation. We give some overarching consistency results for the LSM algorithm in a general setting as well as explore numerically its performance for recursive Cost-of-Capital valuation, a special case of a dynamic monetary utility function.