Title:
An Efficient Numerical Technique to Solve Optimal Stopping Problems

Abstract:

Optimal stopping arises in a variety of applications (e.g., sequential analysis in statistics) but is a problem rarely solved explicitly. I present a new numerical solution technique that exploits the Doob-Meyer (super-martingale) representation of its associated value function together with a variation of a recently developed approach in approximate dynamic programming. The latter, so-called least-squares Monte–Carlo algorithm (or LSM), has been particularly popular in finance. Our technique has the advantage of avoiding two main issues associated with LSM, namely its inherent bias and the basis functions selection problem. Using an American option pricing problem as illustration, where the underlying asset price follows a bi-variate diffusion process, extensive numerical experiments show that our approach yields very accurate prices in a computationally efficient manner. Finally, the flexibility of our method allows for its extension to a much larger class of optimal stopping problems.