Efficiently pricing barrier options in a Markov-switching framework

Abstract:
An efficient Monte-Carlo simulation for the pricing of barrier options in a Markov-switching model is presented. Compared to a brute-force approach, relying on the simulation of discretized trajectories, the presented algorithm simulates the underlying stock-price process only at state changes and at maturity. Given these pieces of information, option prices are evaluated using the probability of Brownian bridges not to fall below some threshold level. It is illustrated how two methods of variance reduction, control variates and antithetic variates, further improve the algorithm. In a small case study, the algorithm is applied to the pricing of options with the EuroStoxx 50 as underlying.

Intellectual Contribution:
Discipline-based Research

Zeitschriftentitel:
Journal of Computational and Applied Mathematics

Jahr: 2010
Band: 235
Heft / Issue: 3
Seiten: 679-685
Reviewed: ja