

Black-Scholes Martingale Model: An Algorithm Analysis

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Abstract. As trading volume and variety of option contracts keep increasing in financial markets around the world, computing speed and running time of financial software have become crucial factors at options trading board where appropriate pricing of option contracts largely depend on the speed and robustness of algorithms involved. In this paper, we analyze several Black-Scholes algorithms, namely, algorithms based on the Black-Scholes-Merton (BSM) Options Pricing Model. In particular, we focus on algorithms based on the martingale approach and analyze the quality and robustness of two main kinds of algorithms: algorithms based on the conditional expectation method and algorithms based on the fixed parameter method. Programming code is provided.

Keywords: Black-Scholes algorithms, Ito martingales, conditional expectations