

عنوان مقاله:

A generalized adaptive Monte Carlo algorithm based on a two-step iterative method for linear systems and its application to option pricing

محل انتشار:

مجله روشهای محاسباتی برای معادلات دیفرانسیل، دوره 12، شماره 4 (سال: 1403)

تعداد صفحات اصل مقاله: 16

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خلاصه مقاله:

In this paper, we present a generalized adaptive Monte Carlo algorithm using the Diagonal and Off-Diagonal Splitting (DOS) iteration method to solve a system of linear algebraic equations (SLAE). The DOS method is a generalized iterative method with some known iterative methods such as Jacobi, Gauss-Seidel, and Successive Overrelaxation methods as its special cases. Monte Carlo algorithms usually use the Jacobi method to solve SLAE. In this paper, the DOS method is used instead of the Jacobi method which transforms the Monte Carlo algorithm into the generalized Monte Carlo algorithm. We establish theoretical results to justify the convergence of the algorithm. Finally, numerical experiments are discussed to illustrate the accuracy and efficiency of the theoretical results. Furthermore, the generalized algorithm is implemented to price options using the finite difference method. We compare the generalized algorithm with standard numerical and stochastic algorithms to show its efficiency.

کلمات کلیدی:

Adaptive Monte Carlo algorithm, Iterative methods, finite difference method, Black Scholes model, Option pricing

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