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Lattice Approximation Methods for American Type Options

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Abstract

Lattice approximation methods based on binomial, trinomial and skeleton approximations for rewards of American type options are studied. Pay-off functions are general possibly discontinuous functions. Underlying log-price processes are assumed to be random walks. These processes are approximated by log-price processes given by random walks with discrete distributions of jumps. Backward recurrence algorithms for computing of reward functions for approximating log-price processes are given. Conditions of convergence for reward functions of approximating log-price process to the corresponding limiting reward functions are presented. These approximation algorithms and their rates of convergence are numerically tested for log-price processes represented by Gaussian and compound Gaussian random walks. Comparison of the above approximation methods is made.