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Studies of Rate of Convergence for Approximations of American Type Options

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Abstract

This master thesis presents three different approximation lattice methods, namely binomial sum model, trinomial sum model and skeleton model, for pricing of American options. The underlying stock price process is assumed to be a geometric Gaussian random walk. First we study reward functions for American options and impose certain conditions on simulating price processes to insure the existence of corresponding reward functions. The conditions under which the reward functions for approximating price process converge to the corresponding limiting rewards are also presented. Also backward recurrence algorithm, for reward functions is discussed. The convergence conditions of these three approximation models are tested. Then numerical tests based on the methods are implemented in MATLAB and some comparisons are made.

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