Title:
Exercise Regions and Efficient Valuation of American Lookback Options

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Abstract

This paper presents an efficient method to compute the values and early exercise boundaries of American lookback options. A key idea underlying the method is the reduction of option valuation to a *single* optimal stopping problem for standard Brownian motion and an associated path-dependent functional, indexed by one parameter in the absence of dividends and by two parameters in the presence of a dividend rate. Numerical results obtained by this method show that, after a space-time transformation, the stopping boundaries are well approximated by certain piecewise linear functions with a few pieces, leading to fast and accurate approximations for American lookback option values. A decomposition formula for American lookback options is derived and applied not only to the development of these approximations but also to the asymptotic analysis of the early exercise boundary near the expiration date.