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THE EVALUATION OF BARRIER OPTION PRICES UNDER STOCHASTIC VOLATILITY

Abstract: This paper considers the problem of evaluating barrier option prices when the dynamics of the underlying are driven by stochastic volatility following the square root process of Heston (1993). We develop a method of lines approach as it conveniently delivers not only the price, but also the delta and gamma of the option. The method is able to efficiently handle both continuously monitored and discretely monitored barrier options. It can also handle barrier options with early exercise features, which is a difficult two dimensional free boundary value problem. We are able to calculate the early exercise boundary of an American barrier option in both the continuously and discretely monitored cases.

This is joint work with Boda Kang and Gunter H. Meyer.