

Valuing American Put Options Using Gaussian Quadrature

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Abstract

This article develops an efficient and accurate method for numerical evaluation of the integral equation which defines the American put option value function. Numerical integration using Gaussian quadrature and function approximation using Chebyshev polynomials are combined to evaluate recursive expectations and produce an approximation of the option value function in two dimensions, across stock prices and over time to maturity. A set of such solutions results in a multidimensional approximation that is extremely accurate and very quick to compute. The method is an effective alternative to finite difference methods, the binomial model, and various analytic approximations.

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