

abstract: The Fourier analysis approach is one of the essential methods used for option pricing. This approach enables us to evaluate various types of options not only when the underlying asset price process follows the celebrated Black-Scholes model, but also when it follows the stochastic volatility models and the Levy process models, including the jump-diffusion models. Few former studies use Fourier analysis to determine the option price on the binomial tree model. This article suggests a new Fourier analysis approach to evaluate the option prices and its sensitivities (Greeks) using the binomial tree model. In the last half of this article, we show that option prices are efficiently and effectively evaluated, even in a wide variety of jump-diffusion models. We can compute option prices in a broad class of jump-diffusion models because we calculate the characteristic function for an underlying asset price numerically. The option prices and sensitivities can be computed very accurately and efficiently, even in binomial tree models with jumps.