



# Closed-Form Solution of European Option under Fractional Heston Model

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**Abstract:** In this paper, we give a closed-form solution of a European option generated by the fractional Heston stochastic volatility model based on the Adomian decomposition method.

**Keywords:** *pricing European option; stochastic volatility; fractional Heston model; Adomian decomposition.*

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## 1 Introduction

The valuation of options is one of the most popular problems in financial mathematical literature. This problem is of interest for both academics and traders. As compared to the case of the Black and Scholes model, where the volatility is constant, the Heston model is more common since the volatility is stochastic, inasmuch as the dynamics of the volatility is fundamental to elaborate strategies for hedging and for arbitrage and a model based on a constant volatility cannot explain the reality of the financial markets. So, the pricing of option under stochastic volatility model is then very important and required.

During the last few decades, several papers studied the existence of closed-form solution of the European option using many methods and generated by different models, for example, the Black and Scholes case [3–5], the Hull and White model [14], the Heston model [6, 12] and recently, Jerbi has given a new closed-form solution for the European option [15] based on a new stochastic process.

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