# Fuzzy pricing of binary option based on the long memory property of financial markets

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**Abstract:** In order to introduce the long memory property of financial markets into the study of binary option pricing under fuzzy environment, the fractional Brownian motion is used to describe the dynamics of the stock price. This paper develops a new framework for pricing the binary option by using fuzzy set theory based on the long memory property of financial markets. The fuzzy price of the binary option is obtained by using a risk-neutral pricing principle and quasi-conditional expectation. To better understand the pricing model, some Greeks of this pricing model are given. In addition, the influence of the Hurst parameter H, a measure of long memory in the financial market, on binary option pricing is analyzed. Finally, the study provides an example that study binary option by fuzzifying the maturity value of the stock price using the triangular fuzzy number. The numerical experiment demonstrates the fuzzy pricing model proposed is rational and practicable.

**Keywords:** Binary option, fuzzy option pricing, fractional brownian motion, asset-or-nothing option

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