

Title: Black-Scholes Models of Option Pricing

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Abstract: In the present master thesis we study a generalization of Black-Scholes model using fractional Brownian motion and jump processes. The main goal is a derivation of the price of call option in a fractional jump market model. The first chapter introduces long memory and its modelling by discrete and continuous time models. In the second chapter fractional Brownian motion is defined, appropriate stochastic analysis is developed and we generalize the notion of Lévy and jump processes. The third chapter introduces fractional Black-Scholes model. In the fourth chapter, tools developed in the second chapter are used for the construction of jump fractional Black-Scholes model and derivation of explicit formula for the price of european call option. In the fifth chapter, we analyze long memory contained in simulated and empirical time series.

Keywords: Black-Scholes model, fractional Brownian motion, fractional jump process, long-memory, options pricing.