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Option Pricing Via Path-wise Comparison of Stochastic Processes and Market Completions

It is well-known that many financial market models do not allow for explicit calculations and they are not accurate enough for the real-world applications. That is why the problem of finding and/or approximation of the acceptable range of option prices becomes very important from both theoretical and practical points of view. We consider two methods to solve this important problem.

We present the option pricing method which gives approximate formulas that are easy to implement and very accurate. The approach exploits a path-wise comparison property of strong solutions of stochastic differential equations. We show how this method works for a class of financial markets with stochastic volatilities (CEV models). Another approach describes option price bounds by means of market completions. In the framework of incomplete multivariate diffusion and jump-diffusion market models we develop a dual theory of option pricing.

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