

Seminar 2021

Math

Extensive networks would eliminate the demand
for pricing formulas

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ZOOM강의

Abstract: In this study, we generate a large number of implied volatilities for the Stochastic Alpha Beta Rho (SABR) model using a graphics processing unit (GPU) based simulation and enable an extensive neural network to learn them. This model does not have any exact pricing formulas for vanilla options, and neural networks have an outstanding ability to approximate various functions. Surprisingly, the network reduces the simulation noises by itself, thereby achieving as much accuracy as the Monte-Carlo simulation. Extremely high accuracy cannot be attained via existing approximate formulas. Moreover, the network is as efficient as the approaches based on the formulas. When evaluating based on high accuracy and efficiency, extensive networks can eliminate the necessity of the pricing formulas for the SABR model. Another significant contribution is that a novel method is proposed to examine the errors based on nonlinear regression. This approach is easily extendable to other pricing models for which it is hard to induce analytic formulas.



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