Recent Developments in Financial Mathematics

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Financial mathematics is a research field that combines the solid mathematical theory in stochastic analysis and probability theory with the applications in complicated financial models. The theory of stochastic analysis have been studied on for many years. However, it becomes more popular and attractive when Black and Scholes (1973) introduced pricing formula for European vanilla call and put options by assuming the stock prices follow geometric Brownian model.

In this talk, I will basically give the fundamental concepts and features in stochastic differential theory. As an example of stochastic differential equations, we examine the celebrated Black and Scholes model in details. Then, the well-known concepts and models in financial mathematics that are successfully applied in industry will be discussed. Moreover, the applications of stochastic differential equations in finance: interest rate theory and financial derivative pricing will also be shortly introduced. I will conclude my talk with the potential research areas in financial mathematics that will be advised for graduate students who are interested in.

Keywords. Derivative pricing, Black and Scholes model, Stochastic analysis.

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