



For favor of posting

The Hong Kong University of Science & Technology

Department of Mathematics

PhD Student Seminar

**Exotic Derivative Hedging with
Neural Network Optimization**

by

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Abstract

With the development of financial markets, more and more complicated and advanced derivatives are designed to fit the market's interests. These exotic products are often linked with multi-assets and under untraditional risk, e.g. correlation, credit-default-risk, etc. Also, as hedging instruments for exotic products can also be illiquid/exotic, hedging can be significant and has a great contribution to final PnL.

If we take all above into consideration, traditional approach of derivative pricing might fail as a lot of assumptions will not hold. At the same time, as we know the analytical solutions of derivative pricing under risk-neutral measure is an optimal solution of B/S PDE, which can also be solved numerically, this gives us the idea to utilize neural networks to conduct optimization to solve these kind of problems.

In this presentation, we will show that we can solve different types of derivative pricing based on back-propagation, starting from vanilla European style options. Also, we can see that a lot of important features of B/S pricing also hold by using NN pricing engine (e.g. vol smile, put-call parity, etc.) by introducing different objective function. In the end, we will talk about the potential of implementing more advanced NN structure to more complicated payoffs that are actually being traded in the market.

Date: Tuesday, 10 September 2019

Time: 6:00 p.m. - 7:00 p.m.

**Venue: Room 4472, Academic Building
(near Lifts 25-26), HKUST**

All are welcome!