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**SEMINAR SERIES ON CHAOS, CONTROL AND COMPLEX NETWORKS**

**What is the right time to buy/sell a stock? A solution to  
Shiryaev-Zhou problem**

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Reception starts at 4:15pm

(Language: **English**)

**Abstract**

With no doubt, we are always keen to sell (buy) a stock at the highest price (respectively lowest price) over a time horizon  $[0, T]$ ; however our dream can never come true as nobody can anticipate the future. Nevertheless, it remains sensible to ask if one can sell (buy) a stock, on the average, as close as possible to its highest price (lowest price) in proportion. In mathematical terms, for illustration, we let  $S_t$  be the stock price process of a given stock and its dynamics is described by a geometric Brownian motion

$$dS_t = S_t (\mu dt + \sigma d\mathbb{B}_t).$$

I shall introduce what the optimal time  $\tau^*$  ( $\theta^*$ ) to sell (buy) the stock is in such a way that

$$\mathbb{E} \left( \frac{S_{\tau^*}}{M_T} \right) = \sup_{0 \leq \tau \leq T} \mathbb{E} \left( \frac{S_{\tau}}{M_T} \right),$$

respectively

$$\mathbb{E} \left( \frac{m_T}{S_{\theta^*}} \right) = \inf_{0 \leq \theta \leq T} \mathbb{E} \left( \frac{m_T}{S_{\theta}} \right),$$

where  $M_T \triangleq \max_{0 \leq \tau \leq T} S_t$  and  $m_T \triangleq \min_{0 \leq \tau \leq T} S_t$ . Moreover, a new simple index for classifying the worthiness of stocks will also be indicated

**About the Speaker**

Dr Phillip Yam graduated from HKU with BSc in Actuarial Science and MPhil degrees, CASM from Cambridge, and DPhil from Oxford. He is presently an Assistant Professor in the Department of Applied Mathematics at Hong Kong Polytechnic University. He is an Assistant Editor of IAEng International Journal of Applied Mathematics. His research interests include theory of rough paths and its applications in geometry, Malliavin Calculus, probability theory and stochastic analysis, actuarial and financial mathematics, etc.