Qualifying Research Seminar

Some Results on Online Portfolio Selection and the Construction of Sparse Probabilistic Boolean Networks

Mr. Fok Hong Kei, Christopher

PhD Student, Department of Mathematics, HKU

(*Supervisor: Professor W.K. Ching*)

September 19, 2024 (Thursday) at 2:30 pm

Rm 210, Run Run Shaw Building, HKU

Abstract

The first part is about the online portfolio selection (OLPS) problem with transaction costs. We propose the state-dependent online portfolio selection algorithm (SOPS) for solving this problem. SOPS utilizes the constant bounds we derived for the transaction cost, the state-dependent exponential moving average method (SEMA) for the prediction of asset returns, the net profit maximization model (NPM) and the net profit maximization model with a risk parity constraint (NPMRP). Our empirical results reveal that the proposed SOPS algorithm can outperform many state-of-the-art OLPS algorithms.

The second part is about the construction problem of sparse Probabilistic Boolean Networks (PBNs). We propose the Greedy Entry Removal (GER) algorithm for solving this problem. Moreover, we derive theoretical upper bounds for GER and two sparse PBN construction algorithms called Simple Entry Removal Algorithm 1 (SER 1) and Simple Entry Removal Algorithm 2 (SER 2). Furthermore, we are the first to study the lower bound problem of the construction of sparse PBNs, and to derive a series of related theoretical results. In our numerical experiments, GER gives the best performance among state-of-the-art sparse PBN construction algorithms.

All are welcome