



THE HONG KONG UNIVERSITY OF SCIENCE & TECHNOLOGY

Department of Mathematics

SEMINAR ON FINANCIAL MATHEMATICS AND APPLIED MATHEMATICS

Weak Hedging Problems: An Optimal Transport Approach

by

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Abstract

In this work, we introduce a general weak hedging problem of European options in complete nonlinear markets, generalising the problems of super-replication, quantile hedging and PnL matching. This new problem allows for an uncountable number of constraints regarding the distribution of the PnL at the terminal time of the claim. In such a nonlinear setting, we show that the problem admits a Monge representation, where the target is not a fixed distribution but rather belongs to a fixed set of distributions. We then introduce the Kantorovitch representation. Under a finite number of constraints in the weak hedging problem, we obtain the equality between the Monge and the Kantorovitch representations. In the case of a linear market, we further introduce and study the dual problem, for which we prove a duality result. This optimal transport approach allows for new numerical methods regarding the computation of weak hedging prices, by solving the dual problem by stochastic gradient descent algorithms. This is a joint work with J.-F. Chassagneux and M. Yang.

Date : 19 January 2023 (Thursday)

Time : 2:00pm

Venue : Room 2463 (Lifts 25/26)

All are Welcome!