Van Eenam Lecture Series

March 21, 22 & 23, 2023

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TITLES AND ABSTRACTS

Recent Advances In Human-Machine Interaction Models and Stochastic Optimization

TUESDAY, MARCH 21, 2023 | 4:00 PM | 1360 EAST HALL | *Reception to follow in Mathematics Upper Atrium*

I will introduce a family of human-machine interaction (HMI) models in optimal asset allocation and portfolio choice (robo-advising). Modeling difficulties stem from the limited ability to quantify the human's risk preferences and describe their evolution, but also from the fact that the stochastic environment, in which the machine optimizes, adapts to real-time incoming information that is exogenous to the human. Furthermore, the human's risk preferences and the machine's states may evolve at different scales. This interaction creates an adaptive cooperative game with both asymmetric and incomplete information exchange between the two parties.

As a result, challenging questions arise on, among others, how frequently the two parties should communicate, what information can the machine accurately detect, infer and predict, how the human reacts to exogenous events, how to improve the inter-linked reliability between the human and the machine, and others. Such HMI models give rise to new, non-standard optimization problems that combine adaptive stochastic control, stochastic differential games, optimal stopping, multi-scales and learning.

Mean Field Games with Unbounded Controls and General Criteria

WEDNESDAY, MARCH 22, 2023 | 4:00 PM | 1360 EAST HALL

I will present and analyze a mean field game with unbounded controls in both the drift and the volatility, and with general payoffs and competition criteria. I will derive the master equation and present solutions, and also construct the optimal state and control processes. The case of random payoffs and competition functions will be also discussed (joint work with P. Souganidis).

Reversible and Irreversible Decisions Under Costly Information Acquisition

THURSDAY, MARCH 23, 2023 | 5:15 PM | 1360 EAST HALL

I will present an optimal stopping problem related to choosing one of two products. The decision maker does not have complete information about one of them, and pays information acquisition costs to learn its quality. The choice action may be reversible or irreversible. This model gives rise to a new family of combined optimal stopping and filtering problems (joint work with R. Xu and L. Zhang).

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