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Hong Kong - Singapore joint Seminar Series in Financial Mathematics/Engineering

Non-asymptotic convergence rates for mean-field games: weak formulation and McKean–Vlasov BSDEs

Professor Dylan Possamaï
ETH, Zurich, Switzerland

Abstract

This work is mainly concerned with the so-called limit theory for mean-field games. Adopting the weak formulation paradigm put forward by Carmona and Lacker, we consider a fully non-Markovian setting allowing for drift control, and interactions through the joint distribution of players' states and controls. We provide first a new characterisation of mean-field equilibria as arising from solutions to a novel kind of McKean–Vlasov backward stochastic differential equations, for which we provide a well-posedness theory. We incidentally obtain there unusual existence and uniqueness results for mean-field equilibria, which do not require short-time horizon, separability assumptions on the coefficients, nor Lasry and Lions's monotonicity conditions, but rather smallness conditions on the terminal reward. We then take advantage of this characterisation to provide non-asymptotic rates of convergence for the value functions and the Nash-equilibria of the N-player version to their mean-field counterparts, for general open-loop equilibria. This relies on new back- ward propagation of chaos results, which are of independent interest. This is a joint work with Ludovic Tangpi.

About the speaker

Dylan Possamaï's research interests span several areas of applied mathematics, including optimization and stochastic control, backward stochastic differential equations, and stochastic analysis, in mathematical finance and economics. Applications areas for his work include robust finance, contract theory, electricity markets, and general incentives problems in economics. Prior to joining the Mathematics Department at ETH Zurich in 2020, Possamaï was an Assistant Professor at Columbia Engineering in from 2017, and assistant professor at Université Paris Dauphine in France from 2012 to 2017. He earned his PhD in 2011 from École Polytechnique, France, and received the best young research in finance and insurance award of the Europlace Institute of Finance in 2017.

Date
19 Jan 2022(Wednesday) (HK Time)

Time
4:00pm – 5:00pm (HK Time)

Zoom
https://cityu.zoom.us/j/98700244497?pwd=UUhYeUluN0hCRnVXWDJIT1dTSEswZz09
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