Contribution ID: **85** Type: **not specified**

Controlled mean-field dynamics in stochastic control problems depending on the law of state process

Friday, August 31, 2018 4:00 PM (30 minutes)

The starting point of the talk is a recent work with Juan Li (Shandong University, Weihai, P.R.China) and Jin Ma (University of South California, Los Angeles, U.S.A.), "A mean-field stochastic control problem with partial observations"(Annals of Appl.Probability, 2017: [1]) in which we studied Pontryagin's optimality principle for a stochastic control problem whose dynamics are given by the stochastic differential equation (SDE)
Z t
Z t
X|Y
X t = x +
b(s, X .∧s , μ s , u s (Y))ds +
σ(s, X .∧s , μ s X|Y , u s (Y))dB s 1 ,
0
0
R t
Y t = 0 h(s, X s)ds + B t 2 , t ∈ [0, T], P -a.s.,
where (B 1 , B 2) is a P -Brownian motion, the controlled state process X is only observable through the observation process Y and so the control process u = u(Y) is a non anticipating functional of the observation process Y . Moreover, unlike classical controlled dynamics, the coefficients σ and b do not only depend on the paths of the controlled state process X and the control u(Y) but also
X|Y
on the law μ s = P ◦ [E[X s |Y r , r ≤ s]] −1 , s ∈ [0, T]. Motivations for such a type of dynamics are given in [1]. However, in [1] the dependence of the law is linear; the talk will study the case where the coefficients are non linear functions of the law. Moreover, unlike in [1] the coefficients b and σ are only supposed to be continuous in the law w.r.t. the 1-Wasserstein metric and on h we only impose boundedness and Lipschitz continuity in the state variable. The main objective of the talk is to prove the weak existence and the uniqueness in law for the above dynamics.

Summary

Presenter: BUCKDAHN, Rainer (Université de Bretagne Occidentale)