UNIVERSITÄT BIELEFELD

BG TS

BGTS Colloquium

Prof. Huyên Pham (University Paris Diderot):

Mean field control/games. A survey.

BGTS Colloquium

Friday, November 8, 2019
4:15 pm

Lecture hall H5

The optimal control of McKean-Vlasov equation, also called mean-field type control (MFC), has become one of the most exciting and tremendous source of development in the general field of stochastic control since the emergence of the mean-field game (MFG) theory, initiated about a decade ago by Lasry/Lions, and Huang/Caines/Malhamé. MFG and MFC have generated crucial advances in the study and understanding of equilibrium behavior of large population of agents in strategic or cooperative interaction. They have known a surge of interest, which is explained by the range of potential applications in various fields (economics, social sciences, biology or electrical engineering), as well as the diversity of used mathematical tools in control, analysis and probability.

The aim of the talk is to present a survey of the topic, with emphasis on the dynamic programming approach and the recent mathematical tools that have been developed in this context: differentiability in the Wasserstein space of probability measures, Itô formula along a flow of probability measures and Master Bellman equation. We shall also discuss some current issues in connection with reinforcement learning with many agents, and deep neural networks techniques for numerical approximation of MFC.