

CityU & NUS

Mean Field Game/Control Seminar

The vanishing viscosity limit for mean field games and diffusion probabilistic models

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Abstract

In this talk, I plan to cover two different topics. In the first part, I will discuss the convergence rate of second order mean-field games to first order ones, motivated by numerical challenges in first order mean field PDEs arising from transportation and crypto modeling, and the weak noise theory in KPZ universality. When the Hamiltonian and the coupling function have a certain growth, the rate is independent of the dimension; on the other hand, the rate decays in dimension (curse of dimensionality) when the Hamiltonian and the coupling function have small growth. This is based on joint work with Yuming Paul Zhang.

The past decade has witnessed the success of generative modeling in creating high quality samples in a wide variety of data modalities. The second part of this talk is concerned with the recently developed diffusion models, the key idea of which is to reverse a certain stochastic dynamics. I will first take a continuous-time perspective, and examine the performance of different SDE schemes including VE and VP. The discretization is more subtle, and our idea is to "contract" the reversed dynamics leading to possible new diffusion model designs. I will also highlight the difference between the ideal continuous time framework, and more realistic discrete modeling. This is based on joint work with Hanyang Zhao.

About the speaker

Wenpin Tang, is an Assistant Professor at Department of Industrial Engineering and Operations Research, Columbia University. Before joining Columbia IEOR, he was a postdoctoral researcher at Department of Industrial Engineering and Operations Research, UC Berkeley, and an assistant adjunct professor at Department of Mathematics, UCLA. His research interests are probability theory, machine learning, and financial technology. One of his current projects is on the diffusion probabilistic models. He published papers in top journals including Annals of Probability, Transactions of the American Mathematical Society, SIAM Journal on Control and Optimization, etc.

Date and Time

Wednesday, 20 September,
09: 00 am

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