

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

Mean Field Optimization Problem Regularized by Fisher Information

Prof. Zhenjie Ren
Université Paris-Dauphine

Abstract

Recently there is a rising interest in the research of mean-field optimization, in particular because of its role in analyzing the training of neural networks. In this talk, by adding the Fisher Information (in other word, the Schrodinger kinetic energy) as the regularizer, we relate the mean-field optimization problem with a so-called mean field Schrodinger (MFS) dynamics. We develop a free energy method to show that the marginal distributions of the MFS dynamics converge exponentially quickly towards the unique minimizer of the regularized optimization problem. We shall see that the MFS is a gradient flow on the probability measure space with respect to the relative entropy. Finally, we propose a Monte Carlo method to sample the marginal distributions of the MFS dynamics. This is an ongoing joint work with Julien Claisse, Giovanni Conforti and Songbo Wang.

About the speaker

Zhenjie Ren is an Assistant Professor at CEREMADE, Université Paris Dauphine-PSL since 2016. Before that he obtained his PhD in applied mathematics at Ecole Polytechnique and a Master in numerical mathematics at Fudan University. His research so far focuses on the topics closely related to the theories of stochastic process, differential equations and optimal control. More broadly, he is interested in topics related to probability, optimization and game theory, in particular the applications to economics, finance and more recently to machine learning.

Date

Mar 16, 2023, Thursday
(HK SAR)

Time

4:30 pm– 5:30 pm (HK
SAR)

Zoom

<https://hkust.zoom.us/j/93244715329?pwd=dmxKS0tsbC85OEgvUFE4OTIESGRldz09>

Meeting ID:
932 4471 5329
Passcode:
3485