



MATH-IMS Joint Applied Mathematics Colloquium Series The Chinese University of Hong Kong

This MATH-IMS Joint Colloquium Series is organized by Center for Mathematical Artificial Intelligence (CMAI), under Department of Mathematics and Institute of Mathematical Sciences (IMS) at The Chinese University of Hong Kong. The colloquium series focuses on mathematics and applications of artificial intelligence, big data and related topics.

Date: Sep 24, 2021 (Friday)

Time: 17:30-18:30 (Hong Kong Time)

Zoom Link: <https://cuhk.zoom.us/j/92775210812>

On the mean field limit of stochastic particle optimization methods

*Speaker: Professor Lorenzo Pareschi
University of Ferrara, Italy*

Abstract: In this talk we will review some recent results on the global minimization of a possibly non-smooth and non-convex high-dimensional objective function by gradient-free stochastic particle methods. In particular, in the first part we will focus on the mean field limit of such methods by considering in detail the case of the well-known particle swarm optimization (PSO) and the recently introduced consensus-based optimization (CBO). In the second part of the talk we consider the challenging situation where the optimization process is restricted to manifolds. Some applications to machine learning problems and rigorous results regarding the mean-field limit and the convergence of the methods to the global minimum are also presented.

Bio: Prof. Pareschi is a full professor at University of Ferrara in Italy. He was head of the mathematics and computer science department from 2012-2018, and head of the mathematics department from 2009-2012. He received his Ph.D. from University of Bologna in 1995. Prof. Pareschi's research activity focuses mainly on phenomena described by time dependent nonlinear PDEs, in particular hyperbolic balance laws and kinetic models, with modern applications that range from gas dynamics, plasma and quantum physics to shallow water, traffic flows, economy and biology. Among his prestigious honors and awards, Prof. Pareschi was a John Von Neumann Professor at TUM Munich and Nelder fellow at Imperial College, London. Among his editorial duties, he has been an associate editor for Communications in Applied and Industrial Mathematics, Entropy, SIAM Journal on Multiscale Modeling and Simulations, SIAM Journal on Scientific Computing, Communications in Mathematical Sciences, and so on.