



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

This MATH-IMS Joint Colloquium Series is jointly organized by 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: Feb 4, 2022 (Friday)

Time: 11:00am-12:00pm (Hong Kong Time)

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

On optimization formulations and algorithms of Markov decision problems

*Speaker: Professor Lexing Ying
Stanford University*

Abstract: Markov decision problems and reinforcement learning have been active research areas in the past decade. Compared with the rapid algorithmic developments, the linear/convex programming formulations of the Markov decision problem are less well-known. In the first part of talk, we will discuss the convex optimization formulations of Markov decision problems in the primal, dual, and primal-dual forms. In the second part of the talk, we will present two new algorithms that are inspired by these optimization formulations and exhibit exponential or even super-exponential convergence.

Bio: Lexing Ying is a professor of mathematics at Stanford University, where he is also a member of the Institute for Computational and Mathematical Engineering. Prof. Ying specializes in scientific computing and numerical analysis. In particular, his research concerns about the design of numerical algorithms for problems in scientific computing. Prof. Ying received his bachelor's degree in computer science and applied mathematics from Shanghai Jiaotong University in 1998. He received his Ph.D. from the Courant Institute at New York University in 2004, under the guidance of Denis Zorin. Before joining Stanford in 2012, he was a post-doc at California Institute of Technology and a professor at University of Texas, Austin. The awards Prof. Ying has received include a Sloan Fellowship in 2007, an NSF Career Award in 2009, the James H. Wilkinson Prize in Numerical Analysis and Scientific Computing in 2013 (for “his outstanding contributions in many areas, including the rapid evaluation of oscillatory integral transforms, high frequency wave propagation and the computation of electron structure in metallic systems”) and a Morningside Silver Medal in 2016.