THE UNIVERSITY OF CHICAGO | THE COMMITTEE ON COMPUTATIONAL AND APPLIED MATHEMATICS

COLLOQUIUM

JIANFENG LU

Mathematics Department
Duke University

Actor-critic method for solving high dimensional Hamilton-Jacobi-Bellman type PDEs

TUESDAY, March 26, at 4:00 PM
Jones 303, 5747 S. Ellis Ave. Chicago, IL 60637

ABSTRACT

In this talk, we will discuss numerical approach to solve high dimensional Hamilton-Jacobi-Bellman (HJB) type partial differential equations (PDEs). The HJB PDEs, reformulated as optimal control problems, are tackled by the actor-critic framework inspired by reinforcement learning, based on neural network parametrization of the value and control functions. Within the actor-critic framework, we employ a policy gradient approach to improve the control, while for the value function, we derive a variance reduced least-squares temporal difference method using stochastic calculus. We will also discuss convergence analysis for the actor-critic method, in particular the policy gradient method for solving stochastic optimal control.

Joint work with Jiequn Han (Flatiron Institute) and Mo Zhou (UCLA).