Title: MEJ: Method of Evolving Junctions for Optimal Control with Constraints

Professor Haomin Zhou
School of Mathematics, Georgia Institute of Technology

Abstract:

We design a new stochastic differential equation (SDE) based algorithm that can efficiently compute the solutions of a class of infinite dimensional optimal control problems with constraints on both state and control variables. The main ideas include two parts. 1) Use junctions to separate paths into segments on which no constraint changes from active to in-active, or vice versa. In this way, we transfer the original infinite dimensional optimal control problems into finite dimensional optimizations. 2) Employ the intermittent diffusion (ID), a SDE based global optimization strategy, to compute the solutions efficiently. It can find the global optimal solution in our numerical experiments. We illustrate the performance of this algorithm by several shortest path problems, the frogger problem and generalized Nash equilibrium examples. This is joint work with Shui-Nee Chow (Math, Georgia Tech), Magnus Egerstedt (ECE, Georgia Tech). Wuchen Li (Math, UCLA), and Jun Lu (Wells Fargo).