

# MATHEMATICS COLLOQUIUM

*Convex optimization for measures: Transition path and  
Mean field game for jump processes*

We focus on the transition path problem and mean field games for Markov jump processes on graph and in general on any Borel space. We first formulate the transition path problem for Markov jump processes as a stochastic optimal control problem in an infinite time horizon. Using the Girsanov transformation for pure jump processes, we choose the certain relative-entropy type running cost and a terminal cost for the stochastic optimal control problem with a stopping time. Unbounded terminal cost serves as a hard constraint, which guarantees the almost sure transition between metastable sets and can be taken care using Gamma -convergence. We prove a closed formula solution for optimal control computed via the discrete committor function. In the deterministic finite time horizon, both transition path and mean field game problem can be formulated as convex optimization for measures. Moreover, disintegration formula puts both finite time and infinite time (stochastic) optimal control into one framework, which are convex optimization problem for path measures.

THURSDAY

OCTOBER

26

4:30 - 5:30PM  
LECONTE COLLEGE  
ROOM 444



Yuan Gao

*Purdue University  
Assistant Professor,  
Department of Mathematics*



UNIVERSITY OF  
**South Carolina**

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