

**COLLOQUIUM**  
**UNIVERSITY OF PITTSBURGH**  
**FRIDAY, OCTOBER 7, 2016**

704 THACKERAY HALL

3:30 P.M.

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**OPTIMAL STOPPING PROBLEMS  
UNDER MODEL UNCERTAINTY**

**ABSTRACT:** As a key topic in stochastic optimization, the optimal stopping has a variety of applications in many areas such as American option pricing, house selling, secretary problem, search theory and etc. The stochastic approach to the optimal stopping exploits the martingale property of the so-called Snell envelope  $Z$  of the reward process  $Y$  and finds that the first time  $Z$  meets  $Y$  is an optimal stopping time. Such a martingale characterization of  $Z$  is closely related to reflected backward SDEs with null generators. By the study of general reflected backward SDEs, we first solved the optimal stopping problem for a large class of nonlinear expectations including risk measures.

When the evaluation criterium uncertainly varies over a set of mutually singular probabilities, one is subject to a path-dependent nonlinear expectation  $\mathcal{E}$ . To address the optimal stopping problem in such a case of model uncertainty, we extend the martingale method to a general non-Markovian setting: By utilizing shifted processes, regular conditional probability distributions and stability of probability pasting, we derived a dynamic programming principal for the Snell envelope  $\mathcal{Z}$  under  $\mathcal{E}$  and then obtained the martingale property of  $\mathcal{Z}$  under the nonlinear expectation  $\mathcal{E}$ . Consequently, the first time  $\mathcal{Z}$  meets the reward  $Y$  is an optimal stopping under model uncertainty. We will also discuss Dynkin game, a coupling of two optimal stopping problems, in this situation.

**Refreshments served at 3:00 p.m.**  
**in the Math Dept. COMMON ROOM, Thackeray 705**