

Optimal stopping of strong Markov processes

Paavo Salminen
Åbo Akademi, Finland

Abstract

Given a non-negative smooth function G the problem of optimal stopping is to find a time point τ^* (a stopping time) such that

$$\sup_{\tau \in \mathcal{M}} \mathbb{E}(G(X_\tau)) = \mathbb{E}(G(X_{\tau^*})),$$

where \mathbb{E} is the expectation associated with the underlying random process X and \mathcal{M} is the set of all stopping times.

The theory of optimal stopping is a crucial tool in, e.g., the following important applications

- sequential statistical testing of hypotheses,
- pricing American options.

This survey talk starts with a discussion of these two motivating examples. After this we focus on infinite horizon optimal stopping problems for continuous time strong Markov processes and present verification theorems obtained by

- principle of smooth pasting,
- Riesz representation of excessive functions,
- representing excessive functions as expected suprema.

The theorems are illustrated via examples with diffusions and Lévy processes.

The talk is concluded with a short discussion on the historical development of the theory of optimal stopping.