Value operators of optimal stopping problems for discrete time multiparameter Markov processes

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Abstract

This paper is concerned with the optimal stopping problem for discrete time multiparameter stochastic processes with the index set $\mathbf{N}^d$. Two value operators of multiparameter optimal stopping problems for discrete time multiparameter Markov processes are defined and their properties are studied.

Keywords : *Multiparameter optimal stopping, value operator, tactic.*

1. Introduction

Let $d \geq 2$ be a fixed positive integer, $\mathbf{N}$ be the set of nonnegative integers and $I = \mathbf{N}^d$. In this paper we consider the stochastic processes indexed by I, which is equipped with the following partial order; for $z = (z^1, z^2, \cdots, z^d)$, $w = (w^1, w^2, \cdots, w^d) \in I$

$$z \leq w \text{ if and only if } z^i \leq w^i \text{ for all } i,$$

$$z < w \text{ if and only if } z \leq w, z \neq w.$$

For $z = (z^1, z^2, \cdots, z^d)$, $|z|$ denotes $\sum_{i=1}^d z^i$. We shall use the definition of multiparameter Markov process studied by Lawler and Vanderbei [4], Mandelbaum [5], Mandelbaum and Vanderbei [6].

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