Abstract:

We address an optimal stopping problem over the set of Bermudan-type strategies $\Theta$ (which we understand in a more general sense than the stopping strategies for Bermudan options in finance) and with non-linear operators (non-linear evaluations) assessing the rewards, under general assumptions on the non-linear operators $\rho$. We provide a characterization of the value family $V$ in terms of what we call the $(\Theta, \rho)$-Snell envelope of the pay-off family. We establish a Dynamic Programming Principle. We provide an optimality criterion in terms of a $(\Theta, \rho)$-martingale property of $V$ on a stochastic interval. We investigate the $(\Theta, \rho)$-martingale structure and we show that the "first time" when the value family coincides with the pay-off family is optimal. The reasoning simplifies in the case where there is a finite number $n$ of pre-described stopping times, where $n$ does not depend on the scenario $\omega$. We provide examples of non-linear operators entering our framework.