

# Infinite Horizon Optimal Search Problem with Hiring and Firing Options

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**Abstract.** As in the classic ‘Secretary Problem’: the candidates arrive sequentially. In this paper, they are represented with i.i.d. Itô diffusion processes. Two interwoven sequences of optimal stopping times are decided which signify the hiring and firing of each candidate. The goal is to choose the stopping times to maximize expected sum of benefit and costs and the time horizon is infinite. The optimality conditions in terms of Martingale Characterization, Least Superharmonic Majorant, and Variational Inequalities are given. The calculation for the simple Brownian case with linear cost/benefit functions is demonstrated.

**Keywords** optimal stopping time; search problem; secretary problem;