

Optimal Choice of the Best Available Applicant in the Full-information Models with Uncertain Selection

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Abstract. The problem we consider here is a full-information best-choice problem in which n applicants appear sequentially, but each applicant has a right to refuse an offer with a known fixed probability $0 \leq q < 1$ independently of the other applicants and all else. The objective is to maximize the probability of choosing the best available applicant. Two models are considered according to when the availability can be ascertained; the availability is ascertained just after the arrival of the applicant (Model 1), whereas the availability can be ascertained only when an offer is made (Model 2). For Model 1, we can obtain the explicit expressions for the optimal stopping rule and the optimal probability for a given n . A remarkable feature of this model is that, asymptotically (i.e., $n \rightarrow \infty$), the optimal probability becomes insensitive to q and approaches 0.580164. The planar Poisson process (PPP) model provides more insight into this phenomenon. For Model 2, the optimal stopping rule depends on the past history in a complicated way and seems to be intractable. We have not solved this model for a finite n but obtain, via the PPP approach, a lower bound on the asymptotically optimal probability. An interesting question whether Models 1 and 2 have the same optimal probability asymptotically still remains unsolved.

Keywords best-choice problem, secretary problem, optimal stopping, planar Poisson process