

## Theory and Methodology

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# Dynamic programming formulation of the group interview problem with a general utility function

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**Abstract:** In many managerial decision situations such as buying an electronic appliance, several groups of alternatives are presented sequentially and an accept-or-reject decision is made immediately after evaluating the alternatives in each group. If each group contains only one alternative, this optimal selection problem is known as the *secretary problem* which has a long and rich history of research devoted to developing solution strategies. We propose a more generalized version of the secretary problem, called the *group interview problem*, in which each group contains more than one alternative and each group is presented and evaluated sequentially over time. Using a dynamic programming approach, we derive a backward recursive equation for solving the group interview problem in which a decision maker's utility of selecting a certain choice is expressed as a general function. Depending on the specific form of this function, we derive optimal selection strategies for various types of group interview problems such as minimum rank, maximum utility, best choice, and one out of the  $p$  best choice problems.

**Keywords:** Applied probability; Optimal stopping rule; Decision analysis; Sequential decision making; Dynamic programming; Stochastic model applications

### 1. Introduction

The secretary problem discussed by Chow et al. (1964) is as follows: (1) There is only one position available, (2) the number  $N$  of applicants is known in advance, (3) there are  $N!$  different permutations or sequences in which the applicants may be interviewed, (4) each permutation of applicants is equally likely, (5) all applicants can be arranged from best to worst without ties, (6) the decision to reject or accept an applicant is based solely on the relative ranks of those applicants interviewed so far, (7) an

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