

## ANALYSIS AND EVALUATION FOR OPTIMAL ALLOCATION IN SEQUENTIAL INTERNET AUCTION SYSTEMS WITH RESERVE PRICE

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**Abstract.** In this paper, we present a new performance model and an analysis for its optimal allocation in a sequential Internet auction system with a set reserve price. In the sequential Internet auction system, a seller wants to sell a given amount of items through sequential auctions on the Internet. The seller has a reserve price for each item. For each auction, the seller should allocate a quantity of items from the total available items to be auctioned. The buyers arrive according to a Poisson process and bid honestly. We first consider the model to be a Markov decision process and present its performance analysis. In the analysis, we show that the result is no difference whether the reserve price is or public. Then we show that in the monotonous properties of the optimal policy, a greater number of items will be allocated if there are more items held or there are fewer horizons remaining. Finally, numerical results are given.

**Keywords.** Web services, Internet auction, Markov decision process, performance analysis, optimal allocation.

**AMS (MOS) subject classification:** 90C40.

## 1 Introduction

In modern information technology, end-to-end quality of service guarantees for multimedia services have become more desirable with the increase in popularity of Internet auctions. This has resulted in several research studies on Internet auctions. For example, based on eBay, Wilcox [7] focused on the impact of the auction experience on bidding behavior. Ockenfels and Roth [3] discussed the bidding strategies such as late bidding and incremental bids in Internet auctions, and pointed out that late bidding is the best response in many environments.

Beam et al. [1] studied an optimal allocation problem in a sequential Internet auction, where a seller holds a given amount of items and wants to sell them in sequential auctions (one after another). At each auction, the buyers arrive according to a Poisson process and bid honestly, while the seller