

# **WINNER DETERMINATION PROBLEM IN COMBINATORIAL AUCTIONS: AN EMPIRICAL STUDY**

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## **Abstract**

Auctions are an effective market mechanism for transacting items where the worth of the transaction is unknown and is determined by the participants interested in the transaction through a bidding process. The highest valuation in terms of price is found by the auction mechanism. This price as also the transaction partners are determined by the same auction process. In the traditional mechanism of conducting auctions preferences were expressed by the bidders for individual items under different auction mechanisms. These had the inbuilt limitations that they failed to address the needs of that market, where bidders had preferences for a set of items in a manner that the valuation for their entire set was higher than the summation of values of individual components of the set. This led to the birth of the combinatorial auction (CA) mechanisms in various forms and adaptations.

In Combinatorial Auctions, multiple goods (items) are available for auction simultaneously, and bidders bid for combinations of goods called bundles. The goods are considered indivisible. The prevalent basic forms of combinatorial auction mechanisms are single unit CA's with a single unit of each item available on auction and the multi unit CA's permitting the auction of multiple units of the items. In these two mechanisms, bidding is a one time process and the bidders bid on their combinations unaware of the

bids of their counterparts. This mechanism though in vogue, has still not been able to

This thesis focuses on methodologies for solving the WDP for single unit and multi unit combinatorial auctions so as to address the limitations to widespread use of these mechanisms. As the other two forms of CA's are a derived form of these two basic CA methodologies we limit the present work to single unit and multi unit case

For the multi unit scena

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