

SEMINAR SERIES
Department of Quantitative Analysis and Operations Management
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University of Cincinnati

“Solving Multi-Object Auctions”

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In many auctions/markets, the value of an object to a participant depends significantly on what other objects the participant does or does not acquire. This dependence is of two main types: complements and substitutes. For the complements case in particular, there has been some concern that such auctions are too difficult to solve exactly. Some of these problems have even been (inaccurately) described as intractable. We describe the use of linear programming (LP/IP) based methods for solving in reasonable time, such multi-object auctions as encountered in practice. We discuss two particular applications: a) the sale of electricity capacity where bidders may bid on bidder specified combinations of several different types of capacity, and b) bidding for job interview slots in a business school. One interesting feature we describe for both applications, but apparently never allowed previously in a multi-object auction, is the capability of a bidder to specify in advance a budget constraint on total purchases. Given that prices are not known in advance, this leads to an interesting nonlinear/nonconvex optimization problem. In the job interview application we describe how time conflicts are handled so that no student has two interviews scheduled that overlap. Students seem to be very pleased with the results.

Linus E. Schrage is Professor of Operations Research and Operations Management in the Graduate School of Business at the University of Chicago, where he has been on the faculty since 1967. His research activities include supply-chain management, optimization, scheduling, multi-object auctions, simulation models, queueing theory, information systems, court and hospital scheduling, and operations management. His current teaching includes computer-based models and managing logistics/distribution systems. He has also been on the faculty at Stanford, was a NASA faculty fellow, and has visited at Pontificia Universidad Catolica in Brazil, UCLA, and Universite Catholique de Louvain in Belgium. He received an S.B. in engineering from St. Louis University, an S.M. in industrial engineering from Cornell University, and a PhD in operations research from Cornell.