

Economic Efficiency versus Communication Complexity

Dov Monderer

Faculty of Industrial Engineering and Management

Technion–Israel Institute of Technology

Haifa 3200, Israel.

E-mail: dov@ie.technion.ac.il

The talk is based on two papers:

1. Bundling Equilibrium in Combinatorial Auctions (co-authored with Ron Holzman, Noa Kfir-Dahav, and Moshe Tennenholtz).
2. Characterization of Ex Post Equilibrium in the VCG Combinatorial Auctions (co-authored with Ron Holzman).

These papers analyze ex post equilibria in the VCG (Vickrey-Clarke-Groves) combinatorial auctions. If Σ is a family of bundles of goods, the organizer may restrict the bundles on which the participants submit bids, and the bundles allocated to them, to be in Σ . The Σ -VCG combinatorial auctions (multi-good auctions) obtained in this way are known to be truth-telling mechanisms. In contrast, these papers deal with non-restricted VCG auctions, in which the buyers restrict themselves to bids on bundles in Σ , because it is rational for them to do so. That is, it may be that when the buyers report their valuation of the bundles in Σ , they are in an equilibrium. We fully characterize those Σ that induce an equilibrium in every VCG auction, and we refer to the associated equilibrium as a bundling equilibrium. We prove that when the number of (potential) buyers is at least three, every ex post equilibrium in the Vickrey-Clarke-Groves combinatorial auction mechanisms is a bundling equilibrium. The number of bundles in Σ represents the communication complexity of the equilibrium. A special case of bundling equilibrium is partition-based equilibrium, in which Σ is a field, that is, it is generated by a partition. We analyze the tradeoff between communication complexity and economic efficiency of bundling equilibrium, focusing in particular on partition-based equilibrium.

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