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Presentation Title

Allocating Positions Fairly: Auctions and Shapley Value (with Matt van Essen)

Abstract

We study the problem of fairly allocating heterogeneous items, priorities, positions, or property rights to participants with equal claims from three perspectives: cooperative, decision theoretic, and non-cooperative. We characterize the Shapley value of the cooperative game and then introduce a class of auctions for non-cooperatively allocating positions. We show that for any auction in this class, each bidder obtains his Shapley value when every bidder follows the auction's unique maxmin perfect bidding strategy. When information is incomplete we characterize the Bayesian equilibrium of these auctions, and show that equilibrium play converges to maxmin perfect play as bidders become infinitely risk averse. The equilibrium allocations thus converge to the Shapley value allocation as bidders become risk averse. Together these results provide both decision theoretic and non-cooperative equilibrium foundations for the Shapley value in an environment with incomplete information.

Keywords

Auction, Shapley value, Positions

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