

CERF Project Update – August 2021

Title

Building a robust combinatorial exchange for portfolio trading: a market design approach

Update on March 2021

I have been developing the theoretical side of the project. More specifically, in highly stylised models I illustrate the shortcomings of trading protocols which do not allow package/portfolio bidding. While it is fairly standard to make the above point, it is far from obvious how to get around the issue. Abstracting away from computational issues, I advocate “core matching” to allow for the full possibility of gains for trades. Realising such trades, however, require specifying “core prices” which support these trades and ensuring that such a matching & pricing protocol is strategically implementable, i.e., incentive compatible. Noting the lack of incentive compatibility as a general impossibility in these environments, I turn my attention to the task of maximising participants’ incentives to bid as close as possible to their true values. I focus on pricing rules with a view towards robustness to perturbations (small changes) in bids. Next, I need (would like) to develop a theoretical justification for specific the pricing rules I identify as “robust”.

Update on August 2021

Following up from the above modelling approach, I conceptualise a measure of “robustness to perturbations in bids” based on a definition of “marginal incentives to deviate from truthful bidding.” Roughly speaking, given an allocation and pricing rule, a bidder’s marginal incentive to deviate is computed by looking at the ratio of profits from a deviation divided by the size of the deviation. For example, for a potential buyer of a single indivisible object, this ratio is 1 if the rule is the first price auction, whereas it is 0 if the rule is the second price auction. For the half-double-auction, this incentive to deviate is $\frac{1}{2}$. Budget balanced and efficient pricing rules are typically not incentive compatible and in particular the marginal incentives to deviate cannot be always 0. Using the concept of marginal incentives to deviate we can in principle compare pricing rules according to their robustness to shading bids for buyers and inflating bids for sellers. For some class of problems, we can identify the most attractive pricing rules according to this criterion.

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