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LEVEL-k AUCTIONS: CAN A NONEQUILIBRIUM MODEL OF STRATEGIC THINKING EXPLAIN THE WINNER'S CURSE AND OVERBIDDING IN PRIVATE-VALUE AUCTIONS?

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Purpose

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Precedents

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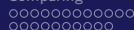
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What's new

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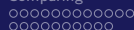
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Result



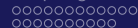
General Model

- ▶ N bidders bid for a single object.
- ▶ X_i is bidder i 's private signal. $X = (X_1, \dots, X_N)$.
- ▶ S_j is additional random variable which is informative about the value of the object. $S = (S_1, \dots, S_M)$.
- ▶ $V_i = u_i(S, X)$ is bidder i 's value of the object, where u_i is symmetric across i .
- ▶ $V_i - p$ is the payoff for the bidder i winning the auction by paying p .
- ▶ Y is the highest signal among bidders other than i .
- ▶ $v(x, y) = E[V_i | X_i = x, Y = y]$ is the expected value conditional on winning.
- ▶ $r(x) = E[V_i | X_i = x]$ is the unconditional expected value.



Classification of Auctions

- ▶ First price auction vs Second price auction
- ▶ Independent private value auction(i.p.v) vs Common value auction(c.v)
- ▶ In i.p.v, the signals and values are independent among bidders.
- ▶ In c.v, the information of i and j is not independent and learning about the other bidders' information can cause the bidder to reassess his estimate of the value of the object. (e.g. Timber auction)



First Price Auction

- ▶ In c.v, the optimal bidding strategy is calculated as follows

Second Price Auction



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Points



First Price Auction



Second Price Auction



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Points



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Random L1 in First Price Auction



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Random L1 in Second Price Auction



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Random L2 in First Price Auction



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Random L2 in Second Price Auction

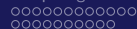


Truthful L1 in First Price Auction



Truthful L1 in Second Price Auction





Truthful L2 in First Price Auction



Truthful L2 in Second Price Auction



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Summary Table

▶ Table 1 を挿入

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Equilibrium vs Cursed Equilibrium in First Price Auction

- ▶ i.p.v
- ▶ c.v.

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Equilibrium vs Cursed Equilibrium in Second Price Auction

- ▶ i.p.v
- ▶ c.v

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Equilibrium vs Random Level-k in First Price Auction

- ▶ i.p.v
- ▶ c.v

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Equilibrium vs Random Level-k in Second Price Auction

- ▶ i.p.v
- ▶ c.v

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Equilibrium vs Truthful Level-k in First Price Auction

- ▶ i.p.v
- ▶ c.v



Equilibrium vs Truthful Level-k in Second Price Auction

- ▶ i.p.v
- ▶ c.v

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Cursed Equilibrium vs Random Level-k in First Price Auction

- ▶ i.p.v
- ▶ c.v



Cursed Equilibrium vs Random Level-k in Second Price Auction

- ▶ i.p.v
- ▶ c.v



Cursed Equilibrium vs Truthful Level-k in First Price Auction

- ▶ i.p.v
- ▶ c.v



Cursed Equilibrium vs Truthful Level-k in Second Price Auction

- ▶ i.p.v
- ▶ c.v

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Summary: Where Level-k Model Can Improve?



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Auction Examples: KL



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Auction Examples: AK



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Auction Examples: GHP



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Preparation for Comparing



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How to Compare



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Table3a



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Table3c



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Table3d



Table3b

- ▶ 他と比率が違う理由もかく

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Summary: Could Level-k Model really Improve?



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Summary



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Implication

