Simplicity in Mechanism Design: An Annotated Reading List

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This is an annotated reading list about simplicity in mechanism design.

1. INTRODUCTION

Practitioners of market design broadly agree that it matters whether a mechanism is simple and user-friendly. Simple mechanisms encourage participation, reduce costly mistakes, and level the playing field between naïve and sophisticated participants. Some mechanisms are intuitively simpler than others, and in controlled experiments simplicity appears to have large effects on participant behavior.

A mathematical analysis of simplicity requires definitions that capture our informal intuitions. Recently, there has been a surge of interest in formalizing what makes a mechanism simple. This enables us to state testable theories about participant behavior, that can yield generalizable design recommendations. Moreover, it allows us to study how simplicity trades off with other desirable properties of mechanisms.

This reading list provides a starting point for newcomers to this nascent literature. It includes data to be explained, some theories that explain them, and technical advances that may aid further work. For brevity, the list omits several noteworthy results.

2. READING LIST

Auctions: A Survey of Experimental Research [Kagel 1995] surveys the literature that studies auctions via real-stakes human-subjects experiments. It documents numerous anomalies that are not predicted by classical theory. These include persistent departures from dominant-strategy play in second-price auctions, but not in ascending auctions.

Obviously Strategy-Proof Mechanisms [Li 2017] defines an incentive criterion that strengthens strategy-proofness and depends on the extensive form. This formalizes the idea that some dominant strategies can be recognized without contingent reasoning. With one-dimensional types and transfers, obvious strategy-proofness pins down the extensive form of the clock auction.

Stable matching mechanisms are not obviously strategy-proof [Ashlagi and Gonczarowski 2018] investigates the design of obviously strategy-proof (OSP) mechanisms for the student-proposing deferred acceptance algorithm. Such mechanisms exist only when student priority rankings are sufficiently aligned.

Gibbard-Satterthwaite Success Stories and Obvious Strategyproofness [Bade and

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Gonczarowski 2017] constructs OSP mechanisms for single-peaked social choice and for house matching. It proves an impossibility result for efficient OSP auctions with multiple goods.

A Theory of Simplicity in Games and Mechanism Design [Pycia and Troyan 2019] proposes a family of solution concepts that models players with limited foresight. It characterizes the OSP extensive-form mechanisms, under a richness assumption on preferences. With some further structure, it characterizes the random priority mechanism as the unique mechanism satisfying fairness, efficiency, and a strengthening of OSP.

A revelation principle for obviously strategy-proof implementation [Mackenzie 2020] shows that if there exists an OSP mechanism for some choice rule, there exists an equivalent OSP mechanism in a smaller class, the *gradual revelation mechanisms*. In these mechanisms, every participant plays pure strategies and all moves are public. This builds on earlier results to simplify the construction of OSP mechanisms.

On the Computational Properties of Obviously Strategy-Proof Mechanisms [Golowich and Li 2021] studies the problem of deciding whether there exists an OSP mechanism for a given choice rule. When the choice rule is represented as a table of induced utilities, it provides a polynomial-time algorithm that decides the problem. It proves a hardness result for more powerful input languages.

Obvious manipulations [Troyan and Morrill 2020] proposes an incentive criterion that weakens strategy-proofness, requiring instead that there be no obvious manipulations. It shows that some mechanisms that Pareto-dominate student-proposing deferred acceptance nonetheless have no obvious manipulations.

Strategically Simple Mechanisms [Börgers and Li 2019] proposes a new simplicity criterion, namely that each player be able to deduce their optimal strategy using only their first-order beliefs about the other players' preferences. This is a weaker criterion than strategy-proofness, that allows additional flexibility when designing mechanisms for voting and bilateral trade.

Iterative versus standard deferred acceptance: Experimental evidence [Bó and Hakimov 2020] reports a lab experiment on the deferred acceptance mechanism. It finds that participants are more likely to play optimally when facing the iterative version of the mechanism than when submitting rank-order lists. This is not explained by the previous theories.

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