Introductory School

"Recent Developments in Mechanism Design"

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organized by
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Abstracts

Felix Brandt (Technical University of Munich)

Funding Public Goods: Collective Distribution of Individual Contributions

Abstract: A growing body of research at the intersection of mechanism design, social choice theory, and fair division studies how to allocate funds to public-interest projects based on the preferences of multiple agents. This tutorial focuses on settings where (i) projects are not associated with fixed costs and (ii) the budget to be distributed is supplied by the agents themselves. A natural application of this setting is donor coordination. Here, the agents are donors willing to contribute money for charitable giving, the public projects are charitable organizations, and the donors have preferences over how money should be distributed among charities. The tutorial will survey recent results in this area, discussing various types of utility functions, including linear, Cobb-Douglas, and Leontief utilities, and illuminate the pervasive conflict between efficiency, strategyproofness, and fairness. Highlights include the Nash product rule, the computer-aided proof of a sweeping impossibility, and natural spending dynamics that converge to socially desirable outcomes.

Paul Klemperer (University of Oxford)

Product-Mix Auctions

Abstract: I will discuss the product-mix auction that I originally designed at the beginning of the financial crisis (2007) for the Bank of England to sell multiple differentiated goods. (The Bank of England currently runs an updated version weekly.) I will also discuss variants of this auction that have been proposed and used in other contexts.

Hervé Moulin (University of Glasgow)

Fair Division: A Progress Report

Abstract: The first part of the lectures covers the main results of the (mostly 20th century) literature on the fair division of private commodities in the cake-cutting and Arrow Debreu (AD) models of resource allocations. The canonical concept of Fair Share Guarantee (FSG) for cake-cutting when

utilities are additive is the simple Proportionality test. For general continuous preferences, the only known general FSG is called the MinMax share, which is far from canonical. In the AD model the FSG is only simple and canonical if preferences are convex. The Envy Freeness (EF) property is an ex post test of fairness while FSG is an ex ante concept. In the AD model it leads naturally to the division rule known as the Competitive Equilibrium with Equal Incomes (CEEI) favoured by economists. The related Gale Eisenberg theorem shows the spectacular set of its properties under the mild homotheticity assumption. For cake cutting, the EF property is inspired by the simple Divide & Choose rule, and leads in turn to several more general algorithms proposed by mathematicians. The solidarity properties reacting to an increase of the manna that must be shared, or of the set of agents entitled to share it, reveal important limits of the competitive approach to Fair Division. The latter also runs into serious difficulties when we share bads (undesirable assets like chores or liabilities). The second part of the lectures focuses on the allocation of indivisible private objects over which preferences are represented by additive utilities. It is born in the 21st century from the interaction between economists and computer scientists. Fair Share Guarantees and Envy Freeness can only be approximated, and there are several ways to do so. The MaxMin share of utilities is a natural but computationally and conceptually difficult form of FSG, contrary to the more transparent approximation of the Proportionality test "up to one object". Similar computational and conceptual problems occur when we try to approximate Envy Freeness. For both Proportionality and Envy Freeness, the handling of good versus bad objects leads to strikingly different results. Monetary transfers under quasi-linear utilities or randomisation are natural ways to go around the indivisibilities of objects and the last lecture will address some successes and limits of these methods.

Antonio Penta (Pompeu Fabra University)

Implementation via Transfers: Robustness, Uniqueness, and Belief Restrictions

Abstract: This short series of lectures will focus on a series of papers, joint with Mariann Ollar, where we put forward a framework for robust mechanism design that can accommodate various degrees of robustness with respect to agents' beliefs. This framework encompasses both the belief-free and Bayesian settings as special cases, but also intermediate environments, where some restrictions on agents' beliefs are maintained, but without entailing the strong assumptions that are implicit in the standard Bayesian paradigm. For general "belief restrictions", we study necessary and sufficient conditions for partial implementation, as well as for unique implementation via transfer schemes.

Based on:

- Ollar and Penta (2017, AER): "Full Implementation and Belief Restrictions"
- Ollar and Penta (2022, AEAp&p): "Efficient Implementation via Transfers: Uniqueness and Sensitivity in Symmetric Environments"
- Ollar and Penta (2023, REStud): "A Network Solution to Robust Implementation: the case of Identical but Unknown Distributions"
- Ollar and Penta (2025, wp1): "Incentive Compatibility and Belief Restrictions"

Vasiliki Skreta (University of Texas at Austin)

Mechanism Design by an Informed Principal

Abstract: These four lectures on "Informed Principal" will go over the fundamental differences of having the designer be a player who has private information and strategically selects a mechanism or

an information structure to achieve their goals, versus the traditional mechanism design approaches according to which the designer is uninformed and selects a mechanism to maximize their goal. The first part will briefly overview the classic papers of Myerson 1983 and Maskin and Tirole 1990 and 1992, as well as the works of Mylovanov and Tröger 2012 and 2014. We will then study an informed principal who has verifiable information (evidence) - Koessler-Skreta 2019 - an informed information designer - Koessler-Skreta 2023 - and will move on to informed communication equilibrium - Koessler-Skreta 2026 - as well as the notion of Neo-optimum of Mylovanov-Tröger 2025.
