UBC Summer Theory Conference
Preliminary Program
August 3rd-5th 2016

Day 1 - August 3rd

8:30-9:30: Registration/Breakfast

9:30-11:00:

Guofu Tan (USC)

Nonlinear Pricing with Asymmetric Competition and Complete Information

11:00-11:30: Coffee Break

11:30-13:00:

Brett Green (Berkeley)

Bargaining and News

13:00-15:00: Lunch

15:00-16:30:

Simon Board (UCLA)

Recruiting Talent

Day 2 - August 4th

8:30-9:30: Breakfast

9:30-11:00:

Anna R. Karlin (University of Washington)

The FedEx Problem

11:00-11:30: Coffee Break

11:30-13:00:

Kevin Leyton-Brown (UBC)

Incentive Auctions and Spectrum Repacking: A Case Study for "Deep Optimization"

13:00-15:00: Lunch

15:00-16:30:

Yingni Guo (Northwestern)

Modes of persuasion towards unanimous consent

6:30: Conference dinner

Day 3 - August 5th

8:30-9:30: Breakfast
9:30-11:00:

Joel Watson (UCSD)

Perfect Bayesian Equilibrium: General Definitions and Illustrations

11:00-11:30: Coffee Break
11:30-13:00:

Anne-Katrin Roesler (Michigan)

Private Learning and Exit Decisions in Collaboration

13:00-15:00: Lunch
15:00-16:30:

Jianrong Tian (UHK)

Informational Inertia

Available abstracts

Guofu Tan (USC)

Nonlinear Pricing with Asymmetric Competition and Complete Information

Motivated by several recent antitrust cases, we study a strategic model of competition in intermediate-goods markets. Our model is a three-stage game with complete information in which a dominant firm offers a general tariff first and then a rival firm responds with a per-unit price, followed by a buyer making her decision to purchase from one or both firms. We characterize subgame perfect equilibria of the game and study the implications of the equilibrium outcome. Our paper makes three main contributions. First, it provides a novel explanation for the prevalence of nonlinear pricing (a menu of offers conditional on volumes) under duopoly in the absence of private information: The dominant firm can use a menu of offers to constrain its rival's choices and extract surplus from the buyer. Second, it shows that when the capacity of the rival firm is constrained, as compared to linear pricing schemes, the nonlinear pricing tariff adopted by the dominant firm reduces the price, sales, and profits of the rival firm as well as the buyer's surplus. In other words, nonlinear pricing may have antitrust implications in the sense that it can lead to partial foreclosure and harm consumer welfare. Third, we establish an equivalence between a subgame perfect equilibrium of the game and an optimal mechanism in a "virtual" principal-agent model with hidden action and hidden information. This involves treating the rival firm's (an agent's) price as its hidden action meanwhile letting the buyer (another agent) to report the rival firm's price as her private information to the dominant firm (the principal). As a result of such an equivalence, we can apply mechanism design techniques to solve for subgame perfect equilibria of the game.

Brett Green (Berkeley)

Bargaining and News

We study a bargaining model in which a buyer makes frequent offers to a privately informed seller. In addition, the buyer gradually learns about the seller's type from a publicly observable news process. We show that the buyer's ability to leverage this information to extract more surplus from the seller is remarkably limited. In fact, the buyer's equilibrium payoff is identical to what he would achieve if he were unable to price discriminate. Delay occurs only if the adverse-selection problem is sufficiently strong. When trade is delayed, the buyer engages in a kind of costly "experimentation" by making offers that are sure to earn him negative payoffs if accepted, but that improve his information and expected continuation payoff if rejected. We investigate the effects of market power by comparing our results to a setting with competitive buyers. Surprisingly, both efficiency and the seller's payoff can decrease by introducing competition among buyers.

Anna R Karlin (University of Washington)

The FedEx Problem

Consider the pricing problem faced by FedEx. Each customer has a package to ship, a deadline d by which he needs his package to arrive, and a value v for a guarantee that the package will arrive by his deadline. FedEx can (and does) offer a number of different shipping options in order to extract more revenue from their customers. In this paper, we solve the optimal (revenue-maximizing) auction problem for the single-agent version of this problem. Our paper adds to the relatively short list of multi-parameter settings for which a closed-form solution is known.

Kevin Leyton-Brown (UBC)

Incentive Auctions and Spectrum Repacking: A Case Study for "Deep Optimization"

This talk will discuss the FCC's "incentive auction"–currently underway!–which proposes to give television broadcasters an opportunity to sell their broadcast rights, to repack remaining broadcasters into a smaller block of spectrum, and to resell the freed airwaves to telecom companies. The stakes for this auction are huge–projected tens of billions of dollars in revenue for the government–justifying the design of a special-purpose descending-price auction mechanism. An inner-loop problem in this mechanism is determining whether a given set of broadcasters can be repacked into a smaller block of spectrum while respecting radio interference constraints. This is an instance of a (worst-case intractable) graph coloring problem; however, stations' broadcast locations and interference constraints are all known

in advance. Early efforts to solve this problem considered hand-crafted mixed-integer programming formulations, but were unable to reliably solve realistic, national-scale problem instances. We advocate instead for a "deep optimization" approach that applies abundant offline computation to tailor an algorithm to the problem at hand. In particular, we leveraged automatic algorithm configuration and algorithm portfolio techniques, alongside constraint graph decomposition; novel caching mechanisms that allow reuse of partial solutions from related, solved problems; and the marriage of local-search and complete SAT solvers. We show that our approach solves virtually all of a set of problems derived from auction simulations within the short time budget required in practice.

Yingni Guo (Northwestern)

Modes of persuasion towards unanimous consent

We study the problem of a fully-committed sender who promotes a project and influences the collective adoption decision by multiple voters. Voters have positively correlated payoff types and heterogeneous thresholds of doubts. We characterize the sender-optimal policy under unanimity rule and compare two modes of persuasion. Under general persuasion, the voters' signals are drawn in a correlated manner conditional on the payoff types of all voters. Under voter-specific persuasion, each voter is presented with evidence about her own payoff type only. We show that under general persuasion, the strictest voters' IC constraints bind. Only the more lenient voters obtain a positive payoff. Under voter-specific persuasion, the sender designates a subgroup of rubber-stampers, another of perfectly informed voters, and a third of partially informed voters. Both the strictest and the most lenient voters might obtain a positive payoff. We argue that under voter-specific persuasion, the strictest voters are strategically granted the role of an "informational guard" of the collective decision.

Joel Watson (UCSD)

Perfect Bayesian Equilibrium: General Definitions and Illustrations

This paper develops a general definition of perfect Bayesian equilibrium (PBE) for extensive-form games, based on a new formulation of consistency for the players' beliefs. The definition applies to all finite games as well as to infinite games with the appropriate measurability structure. The consistency notion, called plain consistency, operates in a familiar way that is convenient for applications: limiting only how a player's belief is updated on consecutive information sets. Plain consistency implies Fudenberg and Tirole's (1991) reasonableness

condition in multistage games with observed actions, and the PBE concept implies subgame perfection. The paper also develops a stronger equilibrium concept called mutual PBE, in which the players' beliefs are required to be derived from a single conditional probability system that satisfies Battigalli's (1996) independence property. Examples and some novel applications are presented to illustrate and compare PBE and mutual PBE with other equilibrium concepts in the literature. Key elements of the approach taken herein are to express a player's belief at an information set as a probability distribution over strategy profiles—called an appraisal—and to then consider conditions on how marginal distributions for subsets of actions are updated.

Anne-Katrin Roesler (Michigan)

Private Learning and Exit Decisions in Collaboration

We study a collaboration model in continuous time, with a positive arrival rate of a success in both the good and the bad state. If the project is bad, players may privately learn about it. At any time, players can choose whether to exit and secure the positive payoff of an outside option, or to stay with the project and exert costly effort. A player's effort not only increases the probability of success, but also serves as an investment in private learning. We identify an equilibrium with three phases. In all phases, uninformed players exert positive effort. Players who become informed and learn that the project is bad never exert effort. Because players bene t from the effort of the others, informed players may not exit immediately. In the first, no-exit phase, informed players do not exit. In the subsequent, gradual-exit phase, they exit with a nite rate. In the final, immediate- exit phase, informed players exit immediately. We find that effort levels may increase in the no-exit phase. Surprisingly, increasing the payoff of the outside option encourages collaboration.

Jianrong Tian (UHK)

Informational Inertia

We fully characterize a basic property, called informational inertia, of experiments with binary states: the posterior belief, after observing a lumpy posterior event, increases with the prior belief. The lack of informational inertia is the reason that information cascades exist in observational learning. We also show that informational inertia illuminates statistical or intrinsic discrimination as well as decision making by committees.