PROGRAMME

Friday, 14 March 2014

Resource sharing, 9:10-10:25

Indirect revelation mechanisms for cake cutting
Simina Brânzei, Department of Computer Science, Aarhus University
Peter Bro Miltersen, Department of Computer Science, Aarhus University

We consider discrete protocols for the classical Steinhaus cake cutting problem. Under mild technical conditions, we show that any deterministic strategy-proof protocol in the standard Robertson-Webb query model is dictatorial, that is, there is a fixed agent to which the protocol allocates the entire cake. In contrast, we exhibit randomized protocols that are truthful in expectation and compute approximately fair allocations.

Reconsidering the Shapley value in games with externalities
Oskar Skibski, Institute of Informatics, University of Warsaw
Tomasz P. Michalak, Department of Computer Science, University of Oxford, and Institute of Informatics, University of Warsaw
Michael Wooldridge, Department of Computer Science, University of Oxford

A long debated but still open question in the coalitional game theory literature is that of how to extend the Shapley value to games with externalities in the spirit of its original axiomatization. Although a few specific extensions have been proposed, they all represent particular cases rather than general results. In this paper, we present a general theory for this problem. We study a method of strengthening the Null-Player Axiom by using alpha-parameterized definition of the marginal contribution in games with externalities, where alpha is a vector of weights associated with an agent joining/leaving a coalition. We prove that this approach yields a unique value for every alpha. Moreover, we show that this method is indeed general, in that all the values that satisfy the direct translation of Shapley's axioms can be obtained using this approach. Next, we analyze how properties of alpha value translate to the requirements on the definition of the marginal contribution (i.e. weights alpha). Building upon this, we show that, under certain conditions, Young's and Myerson's alpha-parameterized axiomatizations are equivalent to Shapley's alpha-parameterized axiomatization.

A Centrality Measure for Networks With a Community Structure Based on the Owen Value
Piotr L. Szczepański, Institute of Informatics, Warsaw University of Technology
Michael Wooldridge, *Computer Science Department, University of Oxford*

There is currently much interest in the problem of measuring the centrality of nodes in networks/graphs; such measures have a range of applications, from social network analysis, to chemistry and biology. In this paper we propose the first measure of node centrality that takes into account the community structure of the underlying network. Our measure builds upon the recent literature on game-theoretic centralities, where solution concepts from game theory are used to reason about importance of nodes in the network. To allow for flexible modelling of community structures, we propose a generalization of the Owen value—a well-known solution concept from cooperative game theory to study games with a priori-given unions of players.

As a result we obtain the first measure of centrality that accounts for both the value of an individual node's relationships within the network and the quality of the community this node belongs to.

Coffee break, 10:25-10:55

Coalitional games and markets, 10:55-12:35

Stable fixtures problem with payments

Péter Wojuteczky, Institute of Economics, Research Centre for Economic and Regional Studies, Hungarian Academy of Sciences
Peter Biro, Department of Operations Research and Actuarial Sciences, Corvinus University of Budapest

In the stable fixtures problem with payments, that we can also refer to as the one-sided multiple partners assignment game, each player may be involved in as many two-members coalitions as her quota and two cooperating players can divide the worth of their coalition between themselves. An outcome of this problem is stable if there is no so-called blocking pair that is a pair of players who would be mutually better off by forming a new pair after possibly withdrawing from one of their other cooperations. In this paper we characterise the set of stable solutions by using linear programming techniques. We show how one can find a stable solution efficiently, if there is any, by reducing the problem to a non-capacitated one. This reduction also provides us simple, alternative proofs for Sotomayor's theorems on the two-sided multiple partners assignment games.

Estimation of partial homogeneity structure in simple games

Mikołaj Jasiński, Institute of Sociology, University of Warsaw

The presentation shows the interesting approach to modelling of incomplete symmetry among players in simple games and the concept of its estimation. The probabilistic characterization of the two most widely used measures of voting power, the Shapley value and the Banzhaf value for simple games will be presented. The concept is based on the assumptions of the homogeneity of players' decision-making criteria in the assembly. The concept of partial homogeneity of players and its sociological interpretation will be also presented as the straightforward way of modelling of the nonuniformity of decision-making patterns.

I will also present the concept of maximum likelihood estimation of the players' homogeneity structure on the basis of the MP's voting. The theoretical concepts will be illustrated by both heuristic examples and on the basis of the empirical data of the Polish Sejm.

Manipulability of core prices in assignment markets

Tamás Solymosi, Corvinus University of Budapest

We consider two-sided housing markets discussed by Shapley and Shubik (1972), where each agent is either a seller or a buyer; each seller owns one house and no buyer demands more than one house; ownerships of the houses are indivisible; utility is transferable and side-payments are allowed. It is well known that in these markets the set of competitive equilibrium payoffs coincides with the core of the related assignment game. Moreover, there are two efficiently computable special allocations in the core: one is simultaneously the best for all buyers, the other is simultaneously the best for all sellers. If a sealed-bid multi-item auction mechanism determines the minimum equilibrium prices related to the buyer-optimal allocation, the buyers

have no incentives to falsify their stated valuations. The sellers, however, can manipulate the process to their benefits, some of them might even realize the full amounts by which they falsified their reservation prices.

We investigate the sensitivity of these two special core allocations in assignment markets, and consequently, of the 'fair' allocation (the average of the buyer-optimal and the seller-optimal allocations). Technically, we show that in the corresponding assignment game both allocations are linewise monotonic, that is, if we change each entry in a row or a column of the profit matrix by the same amount but keep all other entries fixed, the payoff of the corresponding player cannot decrease. More importantly, we establish sharp upper bounds for the extent the payoff of an agent can increase, if he unilaterally falsifies his stated valuation(s).

Our proof is basically relies on a new characterization of the buyer-/seller-optimal allocations, which can also be used for their efficient computation. We define a directed graph containing no cycles of positive length and show that the lengths of the (efficiently computable) longest paths to its nodes give exactly the minimum core payoffs to the associated players.

A characterization of the set of equilibrium price vectors in the Gale-Shapley market model
Zbigniew Świtalski, Faculty of Mathematics, Computer Science and Econometrics, University of Zielona Góra

In the paper we compare two discrete market models (i.e. models in which there is a finite number of indivisible goods and a finite number of buyers who want to buy these goods), namely the classical Gale model described in the book "The Theory of Linear Economic Models" (1960) and the model of Gale-Shapley type, described by the author in a non-published paper "Stability and generalized competitive equilibria in a Gale-Shapley market model" (2013).

We show that in the GS-model the set of equilibrium price vectors is a lattice formed by disjoint union of n-dimensional parallelepipeds, but not necessarily complete nor convex (in the Gale model the respective set is a complete, convex lattice).

Coffee break, 12:35-13:40

Invited talk, 13:40-14:25

Piotr Faliszewski, AGH University of Science and Technology

Axiomatic and Computational Issues in Multi-winner Elections

There are many situations where a group of agents needs to pick a set of items to share. These items can be, for example, movies to be put on a plane's entertainment system, facilities to be built in a given community, or politicians running for a parliament. It turns out that making such choices, given agents' preferences, is a very complicated issue. In this talk we will present scenarios where such multiwinner elections are natural, we will present some well-known and not-so-well-known rules for conducting them, and we will analyze their axiomatic and computational properties. For example, we will see that monotonicity, a very natural property of a voting rule (which says that an increased support for a given alternative should not hurt its chances of winning) is quite a difficult property for multiwinner elections. We will also show that sometimes simple approximation algorithms for hard-to-compute multiwinner rules turn out to be more attractive that the rules they aim to approximate.

Short bio: Piotr Faliszewski obtained his PhD from the University of Rochester, USA and currently holds a position at the AGH University of Science and Techonology in Krakow, where he recently obtained his habilitation. His research interests include computational social choice and algorithmic game theory. In particular, he studies algorithmic issues in elections, such as exact and approximate algorithms for winner determination and the complexity of manipulating and predicting election results, and algorithmic topis in cooperative game theory. His recent work focuses on multiwinner elections, such as, e.g., parliamentary elections. Piotr Faliszewski had won "2013 Research Prize" of "Polityka" magazine in the field of technical studies.

14:25-14:50

Belief distorted Nash equilibria
Agnieszka Wiszniewska-Matyszkiel, Institute of Mathematics, University of Warsaw

This paper presents new concepts of equilibria which can be applicable in dynamic game theoretic problems usually not taken into account in game theoretic modelling of various aspects of real life problems in which players do not have perfect information about the game they play. The questions that are designed to answer to are as follows.

- Can beliefs of players about future values of some parameters being results of players choices cause this future values behave according to their beliefs?
- Can it happen if it is against the objective knowledge about e.g. the dynamics of the system?
- Can such players' behaviour be sustainable even if it does not lead to Nash or correlated equilibrium?

- What is the mechanism?
- Can such beliefs be self-verifying? Is it possible that rational players believe they play a Nash equilibrium?

The class of games under consideration are discrete time dynamic games in which players have imperfect information about the game they play. Players can observe the state variable changing in response to a statistic of players' decisions and past values of this statistics, and form some expectations about their future values based on their observations and best respond to their expectations. Expectations may have various forms: either they are probability distribution of future scenarios as a result of history and player's choice of decision or they constitute sets of scenarios regarded as possible.

Coffee break, 14:50-15:20

Miscellaneous, 15:20-17:00

Predicting Own Actions: Self-fulfilling Prophecy Induced by Proper Scoring Rules
Yuko Sakurai, Department of Informatics, Kyushu University
Makoto Yokoo, Department of Informatics, Kyushu University

We investigate a mechanism for giving the correct incentive to each agent to predict her own future actions and to declare her predictions truthfully. Obtaining an accurate prediction of customer actions is valuable for certain providers (e.g., electricity, bus services) who are required to meet customer demands. If an agent predicts an external event that she cannot control herself (e.g., the weather tomorrow), any proper scoring rule can give a correct incentive. In our problem setting, an agent needs to predict her own action (e.g., what time she will use her washing machine tomorrow) that she can control to maximize her utility. Also, her (gross) utility can vary based on an eternal event. We first prove that a mechanism that utilizes any strictly proper scoring rule can satisfy our goal, assuming an agent can find an optimal declaration that maximizes her expected utility. This declaration is *self-fulfilling*; if she acts to maximize her utility, the probabilistic distribution of her action matches her declaration, assuming her prediction about the external event is correct. Furthermore, we develop for an agent an approximation algorithm, which efficiently finds a semi-optimal declaration, and show that this declaration is still self-fulfilling. We also examine the performance of the approximation algorithm and how an agent acts when she faces an unexpected scenario.

Can quantum version of prisoner's dilemma help in negotiations?
Marek Szopa, Department of Theoretical Physics, University of Silesia

Negotiations based on the prisoner's dilemma [PD] type of games are difficult because their Nash equilibrium is far from Pareto optimal result. In a situation where mutual cooperation can not be guaranteed each negotiator is exposed to the risk of defection of the other side. In this paper we define a quantum PD, for which players' strategies are parameterized by 3D rotations. Quantum strategies are correlated through the mechanism of quantum entanglement and the result of the game is obtained by the collapse of the wave function. Such strategies can be realized by quantum computers and they are completely safe against eavesdropping. Classical PD is a particular case of the quantum game. Each quantum strategy can be, by a

particular choice of counter-strategy, interpreted as 'cooperation' or 'defection'. Quantum PD has Nash equilibria given by the pair of meta-strategies that are more favorable than its classical counterparts. In this paper we show examples of negotiations for which their natural solutions i.e. Nash equilibria are close to Pareto optimal results due to the quantum formulation of PD.

A constructive study of Markov equilibria in stochastic games with strategic complementarities

Łukasz Balbus, Faculty of Mathematics, Computer Sciences and Econometrics, University of Zielona Góra
Kevin Reffett, Department of Economics, Arizona State University, Phoenix, USA
Łukasz Woźny, Department of Theoretical and Applied Economics, Warsaw School of Economics, Warsaw

We study a class of innite horizon, discounted stochastic games with strategic complementarities. In our class of games, we prove the existence of a Stationary Markov Nash equilibrium, as well as provide methods for constructing this least and greatest equilibrium via a simple successive approximation schemes. We also provide results on computable equilibrium comparative statics relative to ordered perturbations of the space of games. Under stronger assumptions, we prove the stationary Markov Nash equilibrium values form a complete lattice, with least and greatest equilibrium value functions being the uniform limit of approximations starting from pointwise lower and upper bounds.

Differential information in large games with strategic complementarities

Łukasz Balbus, Faculty of Mathematics, Computer Sciences and Econometrics, University of Zielona Góra
Paweł Dziewulski, Department of Economics, University of Oxford
Kevin Reffett, Department of Economics, Arizona State University, Phoenix, USA
Łukasz Woźny, Department of Theoretical and Applied Economics, Warsaw School of Economics, Warsaw

We study equilibrium in large games of strategic complementarities (GSC) with dierential information. We dene an appropriate notion of distributional Bayesian-Nash equilibrium in the sense of Mas-Colell (1984) and prove its existence. Furthermore, we characterize order-theoretic properties of the equilibrium set, provide monotone comparative statics for ordered perturbations of the space of games, and provide explicit algorithms for computing extremal equilibria. We complement the paper with new results on the existence of Bayesian-Nash equilibrium in the sense of Balder and Rustichini (1994) or Kim and Yannelis (1997) for large GSC, and provide an analogous characterization of the equilibrium set as in the case of distributional Bayesian-Nash equilibrium. Finally, we apply our results to riot games, beauty contests, and common value auctions. In all cases, standard existence and comparative statics tools in the theory of supermodular games for finite numbers of agents do not apply in general, and new constructions are required.

Saturday, 15 March 2014

Mechanism Design, 9:00-10:40

Information elicitation mechanism for the multiple newsvendor problem with costly forecasting

Peter Egri, Institute for Computer Science and Control, Hungarian Academy of Sciences
Jozsef Vancza, Institute for Computer Science and Control, Hungarian Academy of Sciences

In many domains the satisfaction of aggregate, uncertain demand may incur lower costs (or higher profits) than meeting individual demands apiece. Apart from exploiting economies of scale, in such a setting the risk incurred by demand uncertainty may be shared by the parties. Both factors result in lower overall costs of the service. For instance, in markets of electricity it is now quite a common practice that a service provider elicits demand forecasts of individual customers, aggregates the forecasts and then plans and contracts for the satisfaction of aggregated demand. Similar situation arises in supply networks where a single supplier is responsible for serving a number of different retailers. Here, again, it is better to plan on the basis of aggregated demand than going for the satisfaction of the individual demands of the retailers. Of course, in any case at the time of realization the actual needs of customers may differ from their forecasts. Unless aggregate supply meets aggregate demand this incurs extra cost. The cost of mismatch—both of surplus and shortage—can be decreased only by improving the precision of forecasts.

However, why would be individual customers interested in communicating the service provider as good forecasts as possible? Further to that, why would they care of improving their forecast quality if it is costly? What rules should drive the exchange of information, goods and financial assets so as to warrant the satisfaction of all demand, at the lowest possible cost? Is any way for ensuring a fair sharing of risks and benefits between the parties involved? Could the partners laugh and cry together?

We investigate the above issues by elaborating an aggregate demand prediction problem where a central service provider agent is responsible (1) for eliciting the demand forecasts from a number of self-interested and independent customer agents, and (2) for managing the supply of the required goods. Forecasts are given in form of probability distributions, and generating them incurs costs proportional to their precision. The agents are heterogeneous in the sense that achieving the same precision might imply different costs for them. Service is provided according to a specialised version of the single-period stochastic lot-sizing—so-called newsvendor—model.

We are interested in designing such a mechanism that warrants generic properties like (1) incentive compatibility (each customer agent is interested in (i) creating optimally precise forecasts, and (ii) reporting it to the service provider truthfully), (2) efficiency (the system as a whole operates at the lowest possible cost), (3) individual rationality (the customer agents are interested in taking part in the operation of the mechanism), and (4) budget balance (the mechanism does not run into deficit or accumulate surplus).

Prior work in this field (Rose et al., 2012) investigates a similar model in the domain of electricity markets. Here, a scoring rule based mechanism is presented that fairly distributes the savings among the agents, and warrants individual rationality, incentive compatibility and ex ante weak budget balance properties of the

mechanism. However, incentive compatibility relates only to the truthful reporting of forecasts, their precision is usually not globally optimal, therefore the mechanism is not efficient. In addition, the mechanism has to artificially limit the accepted precision from the agents, thus even the optimal solution could be excluded.

We propose a different scoring rule based mechanism which not only makes the agents interested in reporting truthfully, but also inspires them to achieve the socially optimal forecast precision. Hence, the central service provider agent is then able to optimise the total expected cost of the supply, and this eventuates efficiency in addition to the previously mentioned properties. The presented mechanism is an extension of our previous works (Egri and Váncza, 2013a; Egri and Váncza, 2013b).

Finally, we summarize results of a computational study characteristic to the domain of electricity markets. The numerical experiments help explore among others how the efficiency of the mechanism or the level of required forecast precision vary with the number of customer agents involved.

Efficient Teamwork
Endre Csóka, University of Warwick, Coventry

In real-life multi-agent projects, agents often choose actions that are highly inefficient for the project or damaging for other agents because they care only about their own contract and interests. We show that these are just the result of bad contracting and managing techniques. Namely, we show a mechanism that incentivizes the agents to report their unobservable abilities and chance events truthfully throughout the game, and to manage their own unobservable workflow in order to maximize the overall efficiency of the project. The mechanism is prior-free, individually rational, avoids free riders and collusion-resistant.

Strategy-proof mechanism design for facility location games with weighted agents on a line
Qiang Zhang, Department of Computer Science, City University of Hong Kong
Minming Li, Department of Computer Science, City University of Hong Kong

Approximation mechanism design without money was first studied in Procaccia and Tennenholtz (2009) by considering a facility location game. In general, a facility is being opened and the cost of an agent is measured by its distance to the facility. In order to achieve a good social cost, a mechanism selects the location of the facility based on the locations reported by agents. It motivates agents to strate- gically report their locations to get good outcomes for themselves. A mechanism is called strategyproof if no agents could manipulate to get a better outcome by telling lies regardless of any configuration of other agents. The main contribution in this paper is to explore the strategyproof mechanisms without money when agents are distinguish- able. There are two main variations on the nature of agents. One is that agents prefer getting closer to the facility, while the other is that agents prefer being far away from the facility. We first consider the model that directly extends the model in Procaccia and Tennenholtz (2009). In particular, we consider the strategyproof mechanisms without money when agents are weighted. We show that the strategyproof mechanisms in the case of unweighted agents are still the best in the weighted cases. We establish tight lower and upper bounds for approximation ratios on the optimal social utility and the minimum utility when agents prefer to stay close to the facility. We then provide the lower and upper bounds on the optimal social utility and lower bound on the mini- mum distance per weight when agents prefer to stay far away from the

facility. We also extend our study in a natural direction where two facilities must be built on a real line. Secondly, we propose an novel threshold based model to distinguish agents. In this model, we present a strategyproof mechanism that leads to optimal solutions in terms of social cost.

Majority rule and mechanism design
Maksymilian Kwiek, University of Southampton
Qi Zhang, University of Southampton

This paper studies the problem of optimal design of voting rules when there are two alternatives. The designer is allowed to use any type of non-transferable penalty on individuals, including lengthy conclaves with various levels of qualified majority – in order to elicit voters' private preferences. The main result is that under reasonable assumptions, the society can do no better in terms of utilitarian efficiency, than to follow a simple majority rule.

Coffee break, 10:40-11:00

Algorithmic Game Theory, 11:10-12:25

People are processors: coalitional auctions for complex projects
Piotr Skowron, Institute of Informatics, University of Warsaw
Krzysztof Rządca, Institute of Informatics, University of Warsaw
Anwitaman Datta, Nanyang Technological University, Singapore

To successfully complete a complex project, be it a construction of an airport or of a backbone IT system or crowd-sourced projects, agents (companies or individuals) must form a team (a coalition) having required competences and resources. A team can be formed either by the project issuer based on individual agents' offers (centralized formation); or by the agents themselves (decentralized formation) bidding for a project as a consortium—in that case many feasible teams compete for the employment contract. In these models, we investigate rational strategies of the agents (what salary should they ask? with whom should they team up?) under different organizations of the market. We propose various concepts allowing to characterize the stability of the winning teams. We show that there may be no (rigorously) strongly winning coalition, but the weakly winning and the auction-winning coalitions are guaranteed to exist. In a general setting, with an oracle that decides whether a coalition is feasible, we show how to find winning coalitions with a polynomial number of calls to the oracle. We also determine the complexity of the problem in a special case in which a project is a set of independent tasks. Each task must be processed by a single agent, but processing speeds differ between agents and tasks.

A complexity approach for Pareto efficient exchange with multiple indivisible goods
Etsushi Fujita, Department of Informatics, Kyushu University
Julien Lesca, Department of Informatics, Kyushu University
Akihisa Sonoda, Department of Informatics, Kyushu University
Taiki Todo, Department of Informatics, Kyushu University
Makoto Yokoo, Department of Informatics, Kyushu University

We investigate exchange economies where each agent is initially endowed with a set of indivisible goods and side payments are not allowed. We design a new exchange rule based on Gale's top-trading-cycles (TTC) algorithm and find a domain of agent's preferences under which the rule always chooses a core assignment, and thus is Pareto efficient and individually rational. Furthermore, under the domain of preferences, it has the following three computational/algorithmic properties; (i) running time is polynomial, as TTC is for a single-endowment case, (ii) for each agent, finding the best manipulation is NP-hard, although it cannot be strategyproof due to Sönmez's impossibility result, and (iii) benefit ratio of utility by a manipulation is bounded by a constant of 2. We then apply the rule to a more complicated exchange model where ownerships of endowments are also private for agents. For this model, we clarify the relationships between three types of manipulations, namely misreporting preference, hiding endowments, and splitting accounts.

Approximating the Maxcover problem with bounded frequencies in FPT time

Piotr Skowron, Institute of Informatics
Piotr Faliszewski, AGH University of Science and Technology

We study approximation algorithms for several variants of the MaxCover problem, with the focus on algorithms that run in FPT time. In the MaxCover problem we are given a set N of elements, a family $\mathcal{S}$ of subsets of N, and an integer K. The goal is to find up to K sets from $\mathcal{S}$ that jointly cover (i.e., include) as many elements as possible. This problem is well-known to be NP-hard and, under standard complexity-theoretic assumptions, the best possible polynomial-time approximation algorithm has approximation ratio $(1 - 1/e)$. We first consider a variant of MaxCover with bounded element frequencies, i.e., a variant where there is a constant p such that each element belongs to at most p sets in $\mathcal{S}$. For this case we show that there is an FPT approximation scheme (i.e., for each b there is a b-approximation algorithm running in FPT time) for the problem of maximizing the number of covered elements, and a randomized FPT approximation scheme for the problem of minimizing the number of elements left uncovered (we take K to be the parameter). Then, for the case where there is a constant p such that each element belongs to at least p sets from $\mathcal{S}$, we show that the standard greedy approximation algorithm achieves approximation ratio exactly $1 - e^{-\max(pK/|\mathcal{S}|,1)}$. We conclude by considering an unrestricted variant of MaxCover, and show approximation algorithms that run in exponential time and combine an exact algorithm with a greedy approximation. Some of our results improve currently known results for MaxVertexCover.

Coffee break, 12:25-13:30

Invited talk, 13:30–14:15

Edith Elkind, University of Oxford

Preference Aggregation on Structured Domains

Arrow's famous impossibility theorem (1951) states that there is no perfect voting rule: for three or more candidates, no voting rule can satisfy a small set of very appealing axioms. However, this is no longer the case if we assume that voters' preferences satisfy certain restrictions, such as being single-peaked or single-crossing. In this talk, we discuss single-peaked and single-crossing elections, as well as some other closely related restricted preference domains, and associated algorithmic questions.

Short bio: Edith Elkind is an Associate Professor at University of Oxford. She obtained an MA (Maths) from Moscow State University and a PhD from Princeton (CompSci) in 2005. Before coming to Oxford, she was a postdoctoral fellow at University of Warwick, University of Liverpool, and Hebrew University of Jerusalem, and held faculty positions at University of Southampton and Nanyang Technological University (Singapore). Her research interests are in the areas of algorithmic game theory and computational social choice. She holds editorial positions at Journal of Autonomous Agents and Multiagent Systems (JAAMAS), Journal of AI Research (JAIR), Artificial Intelligence Journal (AIJ), ACM Transactions on Economics and Computation (TEAC), and Fundamenta Informaticae; two of her papers with her PhD students received best student paper awards at the AAMAS conference.

14:15–14:40

Procedural and weighted values for TU games
Marcin Malawski, Institute of Computer Science, Polish Academy of Sciences, and Leon Koźmiński University

A “procedural” value for cooperative TU games (Malawski, IJGT 2013) is determined by an underlying procedure of sharing marginal contributions to coalitions formed by players joining in random order. The value of any player is an expected value of what he obtains after completing all division envisaged by the procedura. This forms a natural generalization of the Shapley value for which every player simply retains own marginal contributions, without any sharing. Even very simple classes of admissible procedures turn out to yield rich and interesting classes of values which, moreover, are uniquely characterized by very natural monotonicity postulates. In the current paper some extensions are provided, including external asymetries among players modelled by weights systems.

Coffee break, 14:40–15:10

Poster presentations, 15:10–15:45

Voting, 15:45-16:35

Plurality voting with truth-biased agents
Svetlana Obraztsova, National Technical University of Athens, Athens, Greece
Evangelos Markakis, Athens University of Economics and Business, Athens, Greece
David Thompson, University of British Columbia, Vancouver, Canada

We study a game-theoretic model for Plurality, one of the most well-studied and widely-used voting rules. It is well known that the most standard game-theoretic approaches can be problematic in the sense that they lead to a multitude of Nash equilibria, many of which are counter-intuitive. Instead, we focus on a model recently proposed to avoid such issues [3, 7, 12]. The main idea of the model is that voters have incentives to be truthful when their vote is not pivotal, i.e., when they cannot change the outcome by a unilateral deviation. This modification is quite powerful and recent simulations reveal that equilibria which survive this refinement tend to have nice properties. We undertake a theoretical study of pure Nash and strong Nash equilibria of this model under Plurality. For pure Nash equilibria we provide characterizations based on understanding some crucial properties about the structure of equilibrium profiles. These properties demonstrate how the model leads to filtering out undesirable equilibria. We also prove that deciding the existence of an equilibrium with a certain candidate as a winner is NP-hard. We then move on to strong Nash equilibria, where we obtain analogous characterizations. Finally, we also observe some relations between strong Nash equilibria and Condorcet winners, which demonstrate that this notion forms an even better refinement of stable profiles.

Some more results on bribery in voting with CP-nets
Dominikus Krüger, Wilhelm-Schickard Institute, University of Tübingen, Tübingen
Britta Dorn, Institute of Theoretical Computer Science, Ulm University, Ulm

We continue previous work by Mattei et al. in which they studies the computational complexity of bribery schemes when voters have conditional preferences that are modeled by CP-nets. We solve two open problems and extend their results for the case that voters are weighted. Moreover, we consider the case of negative (weighted) bribery in CP-nets, when the briber is not allowed to pay voters to vote for his preferred candidate.