

***Efficiency, matching, fairness, and manipulation: some enduring issues in cooperation and aggregation***

A online workshop on game theory

for Mathematics, Computer sciences, Statistics, Economics, and Political sciences faculty and postgraduate /Ph.D. students of universities/institutions in the north-east

23<sup>rd</sup> and 24<sup>th</sup> March 2021, organized by Indian Statistical Institute, Tezpur

**Objective of the workshop:** The objective of this workshop is to introduce fundamentals of cooperative game theory and strategic social choice. Tools from mathematics and statistics are frequently applied in these fields which have important applications in economics and political sciences. In recent times computer science and artificial intelligence communities have also taken a lot of interest in these fields. This workshop aims to provide a brief introduction to these fields to the practitioners of the five disciplines by highly accomplished academicians.

**About the lectures:** There will be four lectures with a maximum length of two hours. Given a society of finite number of agents, a characteristic function assigns a real valued payoff to every coalition of agents. An immediate question is how to allocate the total pay-off of the grand coalition, i.e. the entire society, such that no other coalition has an incentive to deviate from the grand coalition and do better for themselves. The set of allocations which does not allow for such deviations is called core, this notion of stability will be discussed by Prof. Manipushpak Mitra. An important application of the notion of stability of coalitions is matching markets, like matching prospective partners, tenants and houses, organ donors and recipients etc. Prof. Debasis Mishra will discuss the notion of stable matchings. The notion of core incorporates a notion of efficiency, and does not address the concerns about fairness of allocations. Prof. Surajit Borkotokey will discuss a notion of fair allocations for characteristic functions called Shapley value and its applications. Most applications of characteristic form games and matching involve social outcomes. For instance, the set of all matching of prospective partners is a social outcome. Suppose agents have preferences over the set of possible social outcomes. Then it is natural to look for a general class of rules that aggregate preferences of the agents, i.e. map the preferences reported by the agents to social outcomes so that no agent has an incentive to misreport her preference or manipulate the rule. Some issues concerning designing such social choice rules will be discussed by Prof. Arunava Sen.

**About the speakers:** (in an alphabetical order)

Surajit Borkotokey: Professor, Department of Mathematics, Dibrugarh University, Dibrugarh; research interests: cooperative game theory, networks, fuzzy sets, aggregation

Debasis Mishra: Professor, Economics and planning unit, Indian statistical Institute, New Delhi; research interests: mechanism design, auction theory, game theory.

Manipushpak Mitra: Professor, Economic Research Unit, Indian Statistical Institute, Kolkata; research interests: game theory, individual and collective choice, industrial organization, mechanism design, social choice theory.

Arunava Sen: Professor, Economics and planning unit, Indian statistical Institute, New Delhi; research interests: game theory, social choice theory, mechanism design, auction theory.

### **23<sup>rd</sup> March, Tuesday**

**9.30 AM to 10 AM:** Opening remarks Prof. Dipti Prasad Mukherjee, head ISI Tezpur.

**10 AM to 12 Noon:** Introduction to cooperative game theory, Prof. Manipushpak Mitra

(chair: Dr. Mridu Prabal Goswami)

**2 PM to 4 PM:** Introduction to matching theory, Prof. Debasis Mishra,

(chair: Dr. Sanjit Maitra)

### **24<sup>th</sup> March, Wednesday**

**10 AM to 12 Noon:** Shapley value and its applications, Prof. Surajit Borkotokey

(chair: Dr. Kushal Banik Chowdhury)

**2 PM to 4 PM:** Issues in strategic social choice theory, Prof. Arunava Sen

(chair: Dr. Holendro Singh Chungkham)

Vote of thanks: Dr. Mridu Prabal Goswami

In order to register please email back to [game\\_theory\\_workshop2021@isine.ac.in](mailto:game_theory_workshop2021@isine.ac.in) with your name and email ID latest by 17/03/2021

Thanking you

Yours sincerely,

Workshop organizing committee

