
Integer Allocations

Syllabus

Ramses ABUL NAGA

Aix-Marseille School of Economics

6, 13, 20 and 27 February 2019

The PhD course consists of four three-hour lectures, held on Wednesdays from 9 to 12 in room IBD 17.

Lecture 1 Introduction to cooperative games

- 1.1 Key concepts
- 1.2 Bondareva-Shapley theorem
- 1.3 The Weber set
- 1.4 Convex games

Lecture 2 Matching markets

- 2.1 Marriage market game
- 2.2 Gale-Shapley algorithm
- 2.3 Firm-worker matchings
- 2.4 Housing market and Shapley-Scarf algorithm

Lecture 3 Equity and cooperative games

- 3.1 Equity and the core of integer games
- 3.2 Methods of division of indivisible goods
- 3.3 The priority, consistency and proportionality principles
- 3.4 Zero-one allocations
- 3.5 Integer allocations

Lecture 4 Income distribution with integer pay scales

- 4.1 The general redistribution problem
- 4.2 Convex sets and polyhedra
- 4.3 Linear Diophantine equations and their solutions
- 4.4 The limits to redistribution

Reading list

- Beck S., Robins S.: *Computing the Continuous Discretely*, Springer (2007).
- Cahuc, P., Carcillo, S., Zylberberg, A.: *Labor Economics*. MIT Press, Cambridge (2014).
- Chakravarty, S. Mitra, M., Sarkar, P.: *A Course on Cooperative Game Theory*, Cambridge University Press, Delhi (2015).
- Dasgupta, S., C. H. Papadimitriou, Vazirani U. V.: *Algorithms*, Cambridge University Press (2006).
- Grabisch, M.: The core of games on ordered structures and graphs. *Annals of Operations Research*, 204, 33-64 (2013).
- Koriyama Y., Mace A., Laslier J. and R. Treibich. "Optimal Apportionment", *Journal of Political Economy* 121, 584-608, (2013).
- Myerson R.: Graphs and cooperation in games. *Math. of Operations Res.* 2, 225-229 (1977).
- Moulin H.: Priority rules and other asymmetric rationing methods, *Econometrica* 68, 643-684 (2000)
- Moulin, H.: *Fair Division and Collective Welfare*, MIT Press, Cambridge MA (2003).
- Ross, A. Sotomayor, M.: *Two-Sided Matchings*, Cambridge University Press (1990).
- Young, P.: *Equity, in Theory and Practice*, Princeton University Press, Princeton (1994).
- Young P. Dividing the indivisible, *American Behavioral Scientist* 38, 904-920 (1995)

Course lecturer Ramses Abul Naga (I may be contacted directly at Ramses.abulnaga@gmail.com)

Course evaluation A 5'000 to 10'000 words essay extending or completing any of the course topics. This may include a detailed survey or a focussed account of any leading paper in the area. bridge University Press