Auction Theory: Syllabus

Instructor: Xiang Sun

Wuhan University, Economics and Management School
Academic Year 2014–2015, Semester 1

Chinese title: 博弈论与激励理论经典论文研读

Prerequisite: Calculus, Probability, Intermediate Microeconomics, Basic Game Theory

Course description: This course discusses the auction where a single indivisible object is sold to one of many potential buyers. The module focuses on presenting basic concepts, core ideas, main results, and recent developments.

Modular credit: 2 modular credits

Modular number: 0300447 | 20141005374 (数理弘毅班)

Time: Week 1–15, Tuesday, 14:05–14:50, 14:55–15:40, 15:45–16:30

Venue: 1 区 5-310

Module website: http://www.xiangsun.org/teaching. If you can not access, please use VPN.

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- Mailbox: 11-13

Office hours: By appointment

Teaching assistants:

- 谢倩; E-mail: 1724331896@qq.com

Main references:

[Kr] Vijay Krishna, *Auction Theory* (2nd edition), Academic Press, 2010.

[Sun] Xiang Sun, *Lecture Notes on Game Theory: Theory and Examples*, 2014.
Electronic version is available at Sun's homepage.

Language:

- Lectures are in English and Chinese.
- Lecture notes is in English.

Supplements:

[Mi] Paul Milgrom, *Putting Auction Theory to Work*, Cambridge University Press, 2004.

[Bo] Tilman Börgers, *An Introduction to the Theory of Mechanism Design*, 2014.
Electronic version is available at Börgers' homepage.

[JLS] Matthew O. Jackson, Kevin Leyton-Brown and Yoav Shoham, video lectures *Game Theory II: Advanced Applications*.
https://class.coursera.org/gametheory2-002/class.

Group:

- Group 1: 李擎、宋天辰、刘凯欣
- Group 2: 黄柳淙、林潇、汪瑞
- Group 3: 周颖、李佳恩、陆劼
- Group 4: 陈晓光、胡永康、田珣康
- Group 5: 闫玮昊、刘雨婷、陈奕辰
- Group 6: 王筱、文雅、张晨

Grading: Performance (10%), group homework (20%), group presentation (50%), and individual report (20%)

- Group homework: questions in [Kr]
  - Group 1: 3.2, 5.1, 6.5
  - Group 2: 2.1, 5.3, 6.4
  - Group 3: 2.2, 5.5, 6.3
  - Group 4: 2.3, 5.4, 6.2
  - Group 5: 2.4, 4.5, 6.1
  - Group 6: 2.5, 3.1, 5.2
- Bonus:
  - 1 mistake in my notes = 1 mark
  - 3 typos in my notes = 1 mark

  Each mistake and typo will be counted once. First come first get.

Course outline:

- Part 1: introduction of auction
- Part 2: auctions with private values
- Part 3: revenue equivalence principle
- Part 4: qualifications and extensions of the revenue equivalence principle
- Part 5: mechanism design: revelation principle, incentive compatibility, VCG mechanism, AGV mechanism, optimal auction
- Part 6: auctions with interdependent values

Tentative time table:

Week	Lecture	Date	[Kr]	[Sun]	Topics	Remarks
1	1	Sep. 9	1–2.2	4.1–4.3	Introduction, second-price auction	
2	2	Sep. 16	2.3–2.5	4.4–4.6	First-price auction	
3	3	Sep. 23	3	4.7–4.10	Revenue equivalence principle	
5	4	Oct. 11	4.2	16.1	Presentation, envelop theorem	Group 1
6	5	Oct. 14	4.1	16.2	Presentation, introduction of mechanism design	Group 2
7	6	Oct. 21	4.3	16.3.1	Presentation	Group 4
8	7	Oct. 28	4.4	16.3.2	Presentation, dominant strategy mechanism design	Group 3
9	8	Nov. 4		16.3–16.5	VCG mechanism, pivot mechanism, AGV mechanism	
10	9	Nov. 11			Guest lecture by Jingbo Cui	
13	10	Dec. 2		16.6	Optimal auction	
14	11	Dec. 9	6.1–6.4		Presentation	Group 5
15	12	Dec. 16	6.5–6.6		Presentation	Group 6
16		Dec. 23			Lunch	
16		Dec. 25			Due report	
		Mar. 10			Due homework	

Some useful web sites:

- Website of Paul Milgrom