Takako Fujiwara-Greve

Non-Cooperative Game Theory



Contents

1	Games in Game Theory				
	1.1	Games in Game Theory	1		
	1.2	Non-cooperative and Cooperative Games	2		
	1.3	Components of a Game	2		
	Refe	rences.	5		
2	Strategic Dominance				
	2.1	Prisoner's Dilemma	7		
	2.2	Strict Dominance	8		
	2.3	Common Knowledge of a Game	11		
	2.4	Iterative Elimination of Strictly Dominated Strategies	11		
	2.5	Weak Dominance	14		
	2.6	Maximin Criterion	15		
	2.7	Matrix Representation of 3-Player Games	18		
	Problems				
	Refe	rences	21		
3	Nash Equilibrium				
	3.1	Nash Equilibrium	23		
	3.2	Cournot Game	26		
	3.3	Bertrand Game	30		
		3.3.1 When Products Are Differentiated	30		
		3.3.2 When Products Are Perfect Substitutes	31		
	3.4	Location Choice Game	33		
	3.5	Strategic Dominance and Nash Equilibrium [*]	34		
	3.6	Existence of Nash Equilibrium and Mixed Strategies	36		
	3.7	Existence Theorem ^{**}	42		
	3.8	Rationalizability**	45		
	Prob	lems	49		
	Refe	rences	54		

Contents

4	Back	ward Induction	57		
	4.1	Extensive Form Games	57		
	4.2	Strategies in an Extensive-Form Game	63		
	4.3	Backward Induction	68		
	4.4	Chain Store Paradox	71		
	4.5	Stackelberg Game	74		
	4.6	Ultimatum Game	75		
	4.7	Alternating Offer Bargaining Game	76		
	4.8	Introduction of Nature	80		
	4.9	Common Knowledge of Rationality and Backward Induction**	84		
	Probl	ems.	85		
	References.				
5	Subgame Perfect Equilibrium				
	5.1	Subgame Perfect Equilibrium	91		
	5.2	Capacity Choice Game	93		
	5.3	Prisoner's Dilemma of Neuroeconomics	95		
	5.4	Finitely Repeated Games	97		
	5.5	Infinitely Repeated Games	102		
	5.6	Equilibrium Collusion	111		
	5.7	Perfect Folk Theorem [*]	112		
	5.8	Repeated Games with Non-simultaneous Moves*	119		
	5.9	Repeated Games with Overlapping Generations*	123		
	Probl	ems	125		
	Refer	ences	131		
6	Baye	sian Nash Equilibrium	133		
	6.1	Formulation of Games with Incomplete Information	133		
	6.2	Bayesian Games	134		
		6.2.1 Ex-Ante Optimization	138		
		6.2.2 Optimization by 'Type' Players	140		
	6.3	Cournot Game with Incomplete Information	140		
	6.4	Auctions	143		
	6.5	Harsanyi's Purification Theorem [*]	146		
	Probl	ems	148		
	Refer	ences	151		
7	Perfe	ct Bayesian Equilibrium	153		
	7.1	Extensive-Form Games with Incomplete Information	153		
	1.2	Signaling Games.	158		
	1.3	rooming and Separating Equilibrium	160		

	7.4	Refinements of Equilibria [*]	164		
	Proble	ems	167		
	Refere	ences	171		
8	Equili	ibrium Refinements**	173		
	8.1	Further Stability	173		
	8.2	Trembling-Hand Perfect Equilibrium	174		
	8.3	Proper Equilibrium	180		
	8.4	Sequential Equilibrium	182		
	8.5	A Solution to the Chain Store Paradox	188		
	8.6	Infinitely Repeated Games with Imperfect Monitoring	193		
	8.7	Random Matching Games	197		
	8.8	On the Informational Structure of Games	198		
	Proble	ems	200		
	Refere	ences	202		
9	Equil	ibrium Selection*	205		
	9.1	Payoff Dominance and Risk Dominance	205		
	9.2	Global Games**	209		
	9.3	The Kandori-Mailath-Rob Model**	212		
	Proble	ems	215		
	Refere	ences	216		
10	Evolutionary Stability*				
	10.1	Evolutionarily Stable Strategy.	217		
	10.2	Weaker Stability Concepts	224		
	10.3	Cheap Talk	226		
	10.4	Asymmetric Games	228		
	10.5	Stability for Extensive Form Games	228		
	10.6	Voluntarily Separable Repeated Prisoner's Dilemma**	229		
	10.7	Replicator Dynamics	238		
	Proble	ems	244		
	Refere	ences	245		
Арр	pendix	Mathematical Appendix	247		
Index					

The star marks indicate difficulty: no star means introductory level, * means intermediate level, and ** means advanced level. Chapters with varying difficulties have sections with different number of stars. Otherwise all sections are of the same level as the chapter.