

Epistemic Game Theory

Reasoning and Choice

Andrés Perea



CAMBRIDGE
UNIVERSITY PRESS

Contents

<i>List of figures</i>	page xi
<i>List of tables</i>	xiii
<i>Acknowledgments</i>	xvii
1 Introduction	1
Part I Standard beliefs in static games	
2 Belief in the opponents' rationality	13
2.1 Beliefs about the opponent's choice	13
2.2 Utility functions	17
2.3 More than two players	21
2.4 Choosing rationally	25
2.5 Strictly dominated choices	30
2.6 Belief in the opponents' rationality	37
2.7 Graphical method	45
2.8 Algorithm	46
2.9 Proofs	50
Practical problems	56
Theoretical problems	62
Literature	63
3 Common belief in rationality	68
3.1 Beliefs about the opponents' beliefs	68
3.2 Belief hierarchies	80
3.3 Epistemic model	85
3.4 Common belief in rationality	91
3.5 Graphical method	95
3.6 Existence	98
3.7 Algorithm	102

3.8	Order independence	110
3.9	Proofs	112
	Practical problems	118
	Theoretical problems	123
	Literature	124
4	Simple belief hierarchies	134
4.1	Simple belief hierarchies	134
4.2	Nash equilibrium	146
4.3	Computational method	150
4.4	Belief that opponents hold correct beliefs	161
4.5	Proofs	167
	Practical problems	171
	Theoretical problems	175
	Literature	177
Part II Lexicographic beliefs in static games		
5	Primary belief in the opponent's rationality	187
5.1	Cautious reasoning about the opponent	187
5.2	Lexicographic beliefs	190
5.3	Belief hierarchies and types	195
5.4	Cautious types	199
5.5	Primary belief in the opponent's rationality	200
5.6	Common full belief in "primary belief in rationality"	202
5.7	Existence	210
5.8	Weakly dominated choices	213
5.9	Algorithm	215
5.10	Proofs	220
	Practical problems	234
	Theoretical problems	239
	Literature	241
6	Respecting the opponent's preferences	250
6.1	Respecting the opponent's preferences	250
6.2	Common full belief in "respect of preferences"	253
6.3	Existence	258
6.4	Why elimination of choices does not work	261
6.5	Preference restrictions and likelihood orderings	263
6.6	Algorithm	269
6.7	Order independence	276
6.8	Proofs	278
	Practical problems	292

Theoretical problems	296
Literature	298
7 Assuming the opponent's rationality	301
7.1 Assuming the opponent's rationality	301
7.2 Common assumption of rationality	305
7.3 Algorithm	314
7.4 Order dependence	320
7.5 Proofs	321
Practical problems	332
Theoretical problems	337
Literature	339
Part III Conditional beliefs in dynamic games	
8 Belief in the opponents' future rationality	347
8.1 Belief revision	347
8.2 Dynamic games	350
8.3 Conditional beliefs	358
8.4 Epistemic model	366
8.5 Belief in the opponents' future rationality	369
8.6 Common belief in future rationality	375
8.7 Existence	379
8.8 Algorithm	383
8.9 Order independence	392
8.10 Backwards order of elimination	397
8.11 Backward induction	410
8.12 Games with unobserved past choices	419
8.13 Bayesian updating	424
8.14 Proofs	428
Practical problems	447
Theoretical problems	453
Literature	454
9 Strong belief in the opponents' rationality	468
9.1 Strong belief in the opponents' rationality	468
9.2 Common strong belief in rationality	473
9.3 Algorithm	483
9.4 Comparison with backward dominance procedure	493
9.5 Order dependence	501
9.6 Rationality orderings	503
9.7 Bayesian updating	514
9.8 Proofs	515

Practical problems	537
Theoretical problems	543
Literature	545
<i>Bibliography</i>	552
<i>Index</i>	559