

Contents

<i>List of Figures</i>	vii
<i>List of Tables</i>	viii
<i>Preface</i>	ix
<i>Acknowledgments</i>	xi
1 Introduction	1
1.1 A Story from Ancient Athens	1
1.2 Institutions and Economics	2
1.3 Getting the Big Picture	4
1.4 Example: An Auction	7
1.5 A Taste of Social Choice Theory	8
1.5.1 Arrow's Impossibility Theorem	9
1.6 Social Choice Functions	14
1.7 Economic Domain	18
1.7.1 Exchange Economies	18
1.7.2 Social Choice Correspondences on the Exchange Economy Domain	20
1.7.3 The Pareto Social Choice Correspondence	21
1.7.4 The Individually Rational Social Choice Correspondence	23
1.7.5 The Core Social Choice Correspondence	23
1.7.6 The No-Envy Social Choice Correspondence	25
1.7.7 Combinations of the Previous Social Choice Correspondences	25
1.7.8 The Walrasian Social Choice Correspondence	26
1.8 Quasilinear Preferences and Their Uses	27
1.9 Appendix: Proofs	29
1.9.1 Arrow's Impossibility Theorem	29
1.9.2 Gibbard-Satterthwaite Theorem	33
1.10 Exercises	36
2 Dominant Strategy Implementation	38
2.1 Definitions	38
2.2 Revelation Principle	41
2.3 Restricting Domains: Single-Peaked Preferences	43

2.4	Restricted Domains: Quasilinear Domains and Groves Mechanisms	45
2.4.1	Balance Problem	52
2.4.2	Voluntary Participation Problem	53
2.5	The Vickrey Auction	53
2.6	Exercises	55
3	Implementation in Nash Equilibria	58
3.1	A Quick Lesson on Nash Equilibrium	58
3.1.1	Nash Equilibrium in Mixed Strategies	61
3.2	Nash Equilibrium in Implementation	62
3.2.1	Strategy Space Reduction	72
3.3	Two Person Cases	75
3.4	Exercises	78
4	Bayesian Equilibrium and Mechanisms	81
4.1	Preliminary: How to Represent Information	81
4.2	Bayesian Equilibrium	83
4.3	The Bayesian Revelation Principle	86
4.4	The Mechanism of d'Aspremont and Gérard-Varet and of Arrow	88
4.4.1	Voluntary Participation	91
4.5	Optimal Auctions	94
4.6	Bilateral Trading	100
4.7	Exercises	105
5	Refined Nash Implementation	107
5.1	Implementation in Subgame Perfect Equilibrium	107
5.1.1	Subgame Perfect Implementation in Quasilinear Environments	112
5.2	Implementation Using Undominated Strategies	115
5.3	Double Implementation	121
5.3.1	Definitions	121
5.3.2	Ratio Correspondence	123
5.4	Virtual Nash Implementation	126
6	Applications	132
6.1	Manipulation-Resistant Online Reputation Systems	132
6.2	Walrasian Implementation via Market Games	136
6.3	Implementing the Lindahl Social Choice Correspondence	139
6.4	Implementing Fair Allocations	142
6.5	Application to Negative Externality Problems: Pollution Abatement	147
6.6	A Nearly Efficient Mutual Insurance Mechanism	150
6.7	Financing the Athenian Fleet	153

7	Bayesian Implementation	. . . . .	158
7.1	Example of Multiple Bayesian Equilibria	. . . . .	158
7.2	Bayesian Implementation and Bayesian Monotonicity	. . . . .	160
7.2.1	Restrictiveness of Bayesian Monotonicity	. . . . .	166
7.3	Virtual Bayesian Implementation	. . . . .	169
8	Further Topics in Mechanism Design	. . . . .	172
8.1	Endogenous Mechanisms	. . . . .	172
8.1.1	Notation and Definitions	. . . . .	174
8.1.2	An Application: Public Goods	. . . . .	179
8.1.3	Positive Results for Endogenous Games with 3 or More Players	. . . . .	181
8.2	Overcoming Incentive Constraints by Linking Decisions	. . . . .	183
8.2.1	Notation and Definitions	. . . . .	185
8.2.2	Results	. . . . .	187
8.3	Robust Mechanism Design	. . . . .	189
8.3.1	Notation and Definitions	. . . . .	190
8.3.2	Results	. . . . .	192
8.4	The Limits of Ex Post Implementation	. . . . .	195
8.4.1	Notation and a Result	. . . . .	195
8.4.2	An Illustration of the Geometric Condition	. . . . .	197
8.5	Exercises	. . . . .	199
9	Matching Models	. . . . .	202
9.1	What Is Matching?	. . . . .	202
9.1.1	Notation and Definitions	. . . . .	203
9.2	Two-Sided Matching	. . . . .	204
9.2.1	One-to-One Matching	. . . . .	205
9.2.2	Many-to-One Matching	. . . . .	212
9.3	One-Sided Matching	. . . . .	221
9.3.1	The Shapley and Scarf House Market	. . . . .	221
9.3.2	House Allocation Problems	. . . . .	223
9.3.3	The Kidney Exchange Problem	. . . . .	224
9.4	Exercises	. . . . .	226
10	Empirical Evidence on Mechanisms	. . . . .	228
10.1	Introduction	. . . . .	228
10.2	Voluntary Contribution Mechanisms for Public Goods	. . . . .	229
10.3	Tests of Incentive Compatibility	. . . . .	237
10.4	Research on Mechanism Dynamics	. . . . .	239
10.5	Tests of Implementation Concepts	. . . . .	241

10.6	Applied Economic Design: Notes from the Field	244
10.7	Conclusion	250
A	Mathematics Review and More on Economic Domains	254
A.1	Sets, Correspondences, Functions, Intervals	254
A.2	Derivatives and Related Notation	256
A.3	Elements of Mathematical Optimization	258
A.4	Envelope Theorem	259
A.5	The Edgeworth Box	260
A.6	Public Good Economies	261
A.6.1	The Simplest Public Project Model	261
A.6.2	Public Goods Models	261
A.6.3	Social Choice Correspondences	262
A.6.4	Pareto Social Choice Correspondence	263
A.6.5	Lindahl and Constrained Lindahl Social Choice Correspondences	264
A.6.6	Ratio Social Choice Correspondence	270
A.7	Exercises	275
Notation	. . . . .	276
Bibliography	. . . . .	278
Index	. . . . .	288