

CONTENTS

Preface	xi
Acknowledgments	xv
1. Introduction	1
2. Screening	6
2.1. Introduction	6
2.2. Pricing a Single Indivisible Good	6
2.3. Nonlinear Pricing	18
2.4. Bundling	27
2.5. Remarks on the Literature	29
2.6. Problems	29
3. Bayesian Mechanism Design: Examples	31
3.1. Introduction	31
3.2. Single Unit Auctions	31
3.2.1. Setup	31
3.2.2. Mechanisms, Direct Mechanisms, and the Revelation Principle	33
3.2.3. Characterizing Incentive Compatibility and Individual Rationality	36
3.2.4. Expected Revenue Maximization	39
3.2.5. Welfare Maximization	42
3.2.6. Numerical Examples	43
3.3. Public Goods	45
3.3.1. Setup	45
3.3.2. Incentive-Compatible and Individually Rational Direct Mechanisms	46
3.3.3. Ex Ante and Ex Post Budget Balance	47
3.3.4. Welfare Maximization	50
3.3.5. Profit Maximization	57
3.3.6. A Numerical Example	58
3.4. Bilateral Trade	63
3.4.1. Setup	63
3.4.2. Direct Mechanisms	63
3.4.3. Welfare Maximization	65

3.4.4. Profit Maximization	72
3.4.5. A Numerical Example	73
3.5. Remarks on the Literature	74
3.6. Problems	75
4. Dominant Strategy Mechanisms: Examples	76
4.1. Introduction	76
4.2. Single Unit Auctions	78
4.2.1. Setup	78
4.2.2. Mechanisms, Direct Mechanisms, and the Revelation Principle	79
4.2.3. Characterizing Dominant Strategy Incentive Compatibility and Ex Post Individual Rationality	80
4.2.4. Canonical Auctions	81
4.3. Public Goods	84
4.3.1. Setup	84
4.3.2. Direct Mechanisms	85
4.3.3. Characterizing Dominant Strategy Incentive Compatibility and Ex Post Individual Rationality	85
4.3.4. Canonical Mechanisms	87
4.3.5. Ex Post Exact Budget Balance	88
4.4. Bilateral Trade	90
4.4.1. Setup	90
4.4.2. Dominant Strategy Incentive-Compatible and Ex Post Individually Rational Direct Mechanisms	90
4.4.3. Canonical Mechanisms	92
4.4.4. Ex Post Exact Budget Balance	92
4.5. Remarks on the Literature	93
4.6. Problems	93
5. Incentive Compatibility	95
5.1. Introduction	95
5.2. Setup	95
5.3. Weak Monotonicity	96
5.4. Cyclical Monotonicity	99
5.5. Cyclical Monotonicity When Outcomes Are Lotteries	102
5.6. One-Dimensional Type Spaces	103
5.7. Rich Type Spaces	108
5.8. Revenue Equivalence	109
5.9. Individual Rationality	110
5.10. Remarks on the Literature	111
5.11. Problems	111

6. Bayesian Mechanism Design	113
6.1. Introduction	113
6.2. Setup	114
6.3. Independent Types	116
6.4. Correlated Types	119
6.4.1. Framework	119
6.4.2. Failure of Revenue Equivalence	119
6.4.3. Characterizing Bayesian Incentive Compatibility	120
6.4.4. A Numerical Example	124
6.4.5. Individual Rationality and Budget Balance	126
6.4.6. Discussion	127
6.5. Remarks on the Literature	128
6.6. Problems	128
7. Dominant Strategy Mechanisms	130
7.1. Introduction	130
7.2. Dominant Strategy Incentive Compatibility	130
7.3. Implementing Efficient Decision Rules	132
7.4. Positive Association of Differences	134
7.5. Individual Rationality and Budget Balance	137
7.6. Remarks on the Literature	140
7.7. Problems	140
8. Nontransferrable Utility	141
8.1. Introduction	141
8.2. The Gibbard–Satterthwaite Theorem	142
8.2.1. Setup	142
8.2.2. Statement of the Result and Outline of the Proof	143
8.2.3. Every Monotone Direct Mechanism Is Dictatorial	146
8.3. Dominant Strategy Incentive Compatibility on Restricted Domains	149
8.4. Bayesian Incentive Compatibility	151
8.5. Remarks on the Literature	152
8.6. Problems	153
9. Informational Interdependence	155
9.1. Introduction	155
9.2. An Example	156
9.3. Impossibility of Implementing Welfare-Maximizing Decision Rules	158
9.4. Characterizing All Incentive-Compatible Mechanisms	161
9.5. Remarks on the Literature	163
9.6. Problems	163

10. Robust Mechanism Design	164
10.1. Introduction	164
10.2. An Example	166
10.3. Modeling Incomplete Information	169
10.3.1. Hierarchies of Beliefs	170
10.3.2. Type Spaces	172
10.3.3. Common Prior Type Spaces	173
10.4. The Mechanism Designer's Uncertainty	176
10.5. Mechanisms	177
10.6. Bayesian Equilibria and the Revelation Principle	178
10.7. What Can Be Implemented?	182
10.7.1. Belief Revelation	182
10.7.2. Betting	185
10.7.3. Equilibrium Outcomes and Payoff Types	188
10.8. Robust Mechanism Design with a Common Prior	189
10.9. Robust Mechanism Design without a Common Prior	191
10.9.1. The Mechanism Designer's Objectives	191
10.9.2. Undominated Mechanisms	192
10.10. Conceptual Problems in the Quasi-Linear Case	193
10.11. Voting Revisited	195
10.12. Remarks on the Literature	201
10.13. Problems	203
11. Dynamic Mechanism Design	204
11.1. Introduction	204
11.2. Dynamic Private Information	205
11.2.1. Sequential Screening	205
11.2.2. The Role of Private Information	219
11.2.3. Sequential Mechanism Design	224
11.3. Dynamic Allocations	228
11.4. Remarks on the Literature	231
11.5. Problems	233
Notes	235
Bibliography	239
Index	245