

## Contents

Foreword by Ken Binmore	ix
Introduction	xiii
Acknowledgments	xvii
Mathematical Notation	xix
<b>1 Elements of Noncooperative Game Theory</b>	<b>1</b>
1.1 Strategies and Payoff Functions	1
1.2 Dominance Relations and Best Replies	10
1.3 Nash Equilibrium	14
1.4 Refinements of Nash Equilibrium	20
1.5 Symmetric Two-Player Games	25
<b>2 Evolutionary Stability Criteria</b>	<b>33</b>
2.1 Evolutionarily Stable Strategies	35
2.2 Characterizations of ESS	42
2.3 Weaker Evolutionary Stability Criteria	46
2.4 Setwise Evolutionary Stability Criteria	51
2.5 Social Efficiency in Doubly Symmetric Games	55
2.6 Preplay Communication	58
2.7 Role-Conditioned Behaviors	64
<b>3 The Replicator Dynamics</b>	<b>69</b>
3.1 Preliminaries	71
3.2 Dominated Strategies	79
3.3 Nash Equilibrium Strategies	85
3.4 Perfect Equilibrium Strategies	93
3.5 Evolutionarily and Neutrally Stable Strategies and Sets	95
3.6 Doubly Symmetric Games	109
3.7 Pure-Strategy Subsets Closed under Better Replies	114
3.8 Appendix	119
<b>4 Other Selection Dynamics</b>	<b>121</b>
4.1 Discrete-Time Versions of the Replicator Dynamics	122
4.2 The Replicator Dynamics in Cheap-Talk Games	129
4.3 General Selection Dynamics	139
4.4 Replication by Imitation	152

<b>5</b>	<b>Multipopulation Models</b>	163
5.1	Evolutionary Stability Criteria	165
5.2	The Standard and Adjusted $n$ -Population Replicator Dynamics	171
5.3	Replication by Imitation	186
5.4	Replication by Contamination	191
5.5	Classes of Selection Dynamics	193
5.6	Implications of Evolutionary Dynamics for Noncooperative Solution Concepts	202
5.7	Robust Criteria for Evolutionary Dynamic Stability	214
5.8	Appendix	225
<b>6</b>	<b>Elements of the Theory of Ordinary Differential Equations</b>	229
6.1	Differential Equations and Vector Fields	230
6.2	The Induced Solution Mapping	236
6.3	Invariance and Stationarity	240
6.4	Stability Concepts	243
6.5	Lyapunov's Direct Method	245
6.6	Liouville's Formula	249
	Bibliography	255
	Index	261