
Contents

List of Figures	xi
Preface	xvii
Chapter 1. Introduction	1
§1.1. Introduction to pursuit-evasion games	1
§1.2. Graph theory	6
§1.3. Exercises	13
Chapter 2. Cops and Robbers	17
§2.1. Introduction to the game of Cops and Robbers	19
§2.2. The structure of cop-win graphs	23
§2.3. Bounds on the cop number and guarding	28
§2.4. The cop number of planar graphs	35
§2.5. Meyniel's conjecture on the cop number	41
§2.6. Capture time	50
§2.7. Exercises	54
§2.8. Projects	57
Chapter 3. Graph Searching	59
§3.1. Introduction to graph searching	59
§3.2. Classes and bounds	64

§3.3. Monotonicity	68
§3.4. Node search and pathwidth	73
§3.5. The search number of trees	80
§3.6. Helicopter Cops and Robbers	84
§3.7. Exercises	87
§3.8. Projects	90
Chapter 4. Graph Burning	91
§4.1. Introduction to graph burning	91
§4.2. Burning trees	95
§4.3. The burning number conjecture	100
§4.4. Burning spiders	107
§4.5. Burning graph classes	114
§4.6. Exercises	118
§4.7. Projects	120
Chapter 5. The Localization Game	121
§5.1. Introduction to the Localization game	124
§5.2. Localization on bipartite graphs and trees	126
§5.3. Connections with other graph parameters	129
§5.4. Localization on hypercubes	136
§5.5. Localization on graph classes	139
§5.6. Localization capture time	153
§5.7. Exercises	158
§5.8. Projects	161
Chapter 6. Firefighter	163
§6.1. Introduction to Firefighter	163
§6.2. Core results on Firefighter	165
§6.3. Firefighting on grids	171
§6.4. Surviving rate of a graph	176
§6.5. Exercises	181
§6.6. Projects	183

Chapter 7. Invisible Robber Games	185
§7.1. Introduction to invisible robber games	185
§7.2. 0-visibility Cops and Robbers	188
§7.3. Limited-visibility Cops and Robbers	194
§7.4. Hyperopic Cops and Robbers	200
§7.5. Exercises	206
§7.6. Projects	209
Chapter 8. Variants of Pursuit-Evasion Games	211
§8.1. Lazy Cops and Robbers	213
§8.2. Cops and Eternal Robbers	216
§8.3. Burning the plane	221
§8.4. Constrained Firefighter	224
§8.5. Angel and Devil	227
§8.6. Pursuing the pursuers	230
§8.7. Exercises	234
§8.8. Projects	235
Bibliography	237
Index	251