

Contents

List of Figures	<i>vii</i>
Preface to the 1992 Edition	<i>ix</i>
Preface	<i>xiii</i>
1. The General Setting	<i>1</i>
1. Introduction	<i>1</i>
2. Preliminary survey	<i>3</i>
3. A simple artificial adaptive system	<i>6</i>
4. A complex natural adaptive system	<i>9</i>
5. Some general observations	<i>16</i>
2. A Formal Framework	<i>20</i>
1. Discussion	<i>20</i>
2. Presentation	<i>28</i>
3. Comparison with the Dubins-Savage formalization of the gambler's problem	<i>30</i>
3. Illustrations	<i>32</i>
1. Genetics	<i>32</i>
2. Economics	<i>36</i>
3. Game-playing	<i>40</i>
4. Searches, pattern recognition, and statistical inference	<i>44</i>
5. Control and function optimization	<i>54</i>
6. Central nervous systems	<i>58</i>
4. Schemata	<i>66</i>
5. The Optimal Allocation of Trials	<i>75</i>
1. The 2-armed bandit	<i>76</i>
2. Realization of minimal losses	<i>83</i>
3. Many options	<i>85</i>
4. Application to schemata	<i>87</i>

6. Reproductive Plans and Genetic Operators	89
1. Generalized reproductive plans	90
2. Generalized genetic operators—crossing-over	97
3. Generalized genetic operators—inversion	106
4. Generalized genetic operators—mutation	109
5. Further increases in power	111
6. Interpretations	118
7. The Robustness of Genetic Plans	121
1. Adaptive plans of type $\mathcal{R}_1(P_C, P_I, {}^1P_M, \langle c_i \rangle)$	121
2. The robustness of plans $\mathcal{R}_1(P_C, P_I, {}^1P_M, \langle c_i \rangle)$	124
3. Robustness vis-à-vis a simple artificial adaptive system	132
4. Robustness vis-à-vis a complex natural adaptive system	136
5. General consequences	139
8. Adaptation of Codings and Representations	141
1. Fixed representation	141
2. The “broadcast language”	143
3. Usage	148
4. Concerning applications and the use of genetic plans to modify representations	153
9. An Overview	159
1. Insights	159
2. Computer studies	161
3. Advanced questions	164
10. Interim and Prospectus	171
1. In the interim	171
2. The optimal allocation of trials revisited	181
3. Recent work	184
4. Possibilities	195
Glossary of Important Symbols	199
Bibliography	203
Index	207

