# Contents

*Preface*  

<table>
<thead>
<tr>
<th>Preface</th>
<th>page xi</th>
</tr>
</thead>
</table>

A summary of the book in a nutshell  

1

**PART A WEAK WIN AND STRONG DRAW**  

**Chapter I Win vs. Weak Win**  

<table>
<thead>
<tr>
<th>1</th>
<th>Illustration: every finite point set in the plane is a Weak Winner</th>
</tr>
</thead>
<tbody>
<tr>
<td>2</td>
<td>Analyzing the proof of Theorem 1.1</td>
</tr>
<tr>
<td>3</td>
<td>Examples: Tic-Tac-Toe games</td>
</tr>
<tr>
<td>4</td>
<td>More examples: Tic-Tac-Toe like games</td>
</tr>
<tr>
<td>5</td>
<td>Games on hypergraphs, and the combinatorial chaos</td>
</tr>
</tbody>
</table>

**Chapter II The main result: exact solutions for infinite classes of games**  

| 6 | Ramsey Theory and Clique Games |
| 7 | Arithmetic progressions |
| 8 | Two-dimensional arithmetic progressions |
| 9 | Explaining the exact solutions: a Meta-Conjecture |
| 10 | Potentials and the Erdős-Selfridge Theorem |
| 11 | Local vs. Global |
| 12 | Ramsey Theory and Hypercube Tic-Tac-Toe |

**PART B BASIC POTENTIAL TECHNIQUE – GAME-THEORETIC FIRST AND SECOND MOMENTS**  

**Chapter III Simple applications**  

| 13 | Easy building via Theorem 1.2 |
| 14 | Games beyond Ramsey Theory |
| 15 | A generalization of Kaplansky’s game |

vii
**Chapter IV  Games and randomness**  
16 Discrepancy Games and the variance  
17 Biased Discrepancy Games: when the extension from fair to biased works!  
18 A simple illustration of “randomness” (I)  
19 A simple illustration of “randomness” (II)  
20 Another illustration of “randomness” in games

**PART C  ADVANCED WEAK WIN – GAME-THEORETIC HIGHER MOMENT**

**Chapter V  Self-improving potentials**  
21 Motivating the probabilistic approach  
22 Game-theoretic second moment: application to the Picker–Chooser game  
23 Weak Win in the Lattice Games  
24 Game-theoretic higher moments  
25 Exact solution of the Clique Game (I)  
26 More applications  
27 Who-scores-more games

**Chapter VI  What is the Biased Meta-Conjecture, and why is it so difficult?**  
28 Discrepancy games (I)  
29 Discrepancy games (II)  
30 Biased Games (I): Biased Meta-Conjecture  
31 Biased games (II): Sacrificing the probabilistic intuition to force negativity  
32 Biased games (III): Sporadic results  
33 Biased games (IV): More sporadic results

**PART D  ADVANCED STRONG DRAW – GAME-THEORETIC INDEPENDENCE**

**Chapter VII  BigGame–SmallGame Decomposition**  
34 The Hales–Jewett Conjecture  
35 Reinforcing the Erdős–Selfridge technique (I)  
36 Reinforcing the Erdős–Selfridge technique (II)  
37 Almost Disjoint hypergraphs  
38 Exact solution of the Clique Game (II)
Chapter VIII  Advanced decomposition  504
39  Proof of the second Ugly Theorem  505
40  Breaking the “square-root barrier” (I)  525
41  Breaking the “square-root barrier” (II)  536
42  Van der Waerden Game and the RELARIN technique  545

Chapter IX  Game-theoretic lattice-numbers  552
43  Winning planes: exact solution  553
44  Winning lattices: exact solution  575
45  I-Can-You-Can’t Games – Second Player’s Moral Victory  592

Chapter X  Conclusion  610
46  More exact solutions and more partial results  611
47  Miscellany (I)  620
48  Miscellany (II)  634
49  Concluding remarks  644

Appendix A  Ramsey Numbers  658
Appendix B  Hales–Jewett Theorem: Shelah’s proof  669
Appendix C  A formal treatment of Positional Games  677
Appendix D  An informal introduction to game theory  705
Complete list of the Open Problems  716
What kinds of games? A dictionary  724
Dictionary of the phrases and concepts  727

References  730