
Preface

The disjunctive theory of combinatorial games can trace its roots to the work of Sprague and Grundy in the 1930s, but its modern form was born with the arrival of Conway's *On Numbers and Games* in 1976 and the classic *Winning Ways for Your Mathematical Plays* by Berlekamp, Conway, and Guy in 1982. In the ensuing three decades, combinatorial game theory has blossomed into a serious and active branch of combinatorics, with connections to coding theory, computational complexity, and commutative algebra.

This book is intended as a second course on combinatorial games, at the first- or second-year graduate level, and most readers will benefit from some prior exposure to the subject. *Winning Ways* is a fine introduction; in addition, an excellent new textbook by Albert, Nowakowski, and Wolfe, titled *Lessons in Play: An Introduction to Combinatorial Game Theory*, has recently appeared. Either (or both) of these references should serve as adequate preparation for this volume.

Nonetheless, this book is completely self-contained and traces the development of the theory from first principles and examples through many of its most recent advances. It should serve those who have read *Winning Ways* and crave a more rigorous development of the theory, as well as professionals seeking a cohesive reference for the many new ideas that have emerged in recent years. Among those advances appearing for the first time in textbook form (as far as I know) are Berlekamp's generalized temperature theory, Thane Plambeck's elegant theory of misère quotients, David Moews' results on the group structure of \mathbb{G} , and the construction of misère canonical forms for partizan games.

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Combinatorial game theory, in its modern form, is still a young field; many areas of the subject are still poorly understood and many questions remain unanswered. Open problems and conjectures are sprinkled throughout the text and are summarized in Appendix A. If this book provides a reservoir of tools and inspiration to attack these problems, then it will be a success.

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