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Edited by Richard J. Nowakowski
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The volume contains the first comprehensive explorations of misère games. It includes a tutorial for the very successful approach to analyzing misère impartial games and the first attempt at using it for misère partisan games. It also includes an updated version of Unsolved Problems in Combinatorial Game Theory and the Combinatorial Games Bibliography. The well-known normal-play games of Hex and Go are featured as well as new games: Toppling Dominoes has already spawned several papers and graduate theses; Maze extends the analysis of option-closed games; the question of Nim-dimension is introduced and new regularities are seen in take-and-break games.

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Preface

This volume has its roots in the Banff International Research Station (BIRS) Workshop on Combinatorial Games (2008) organized by Elwyn Berlekamp, Tristan Cazenave, Aviezri Fraenkel, Martin Mueller and Richard J. Nowakowski. The research presented and collaboration started at BIRS has had great impact on the field. Some important seminal papers are in this volume.

Misère games are well represented. Aaron Siegel continues his work on impartial misère quotients in “The structure and classification of misère quotients” and gives a walk-through of the techniques required to analyze these games in “Misère canonical forms of partizan games”. Mike Weimerskirch’s article offers another approach. Of even greater impact is Siegel’s “Misère canonical forms of partizan games”, which has already spawned several papers, while Meghan R. Allen’s “Peeking at partizan misère quotients” gives a hint of the new directions being taken.

In “Nimbers in partizan games”, Carlos Pereira dos Santos and Jorge Nuno Silva expand on an early question of Berlekamp and introduce the nim-dimension measure.

The early analysis (prior to 1960) of Wythoff’s game opened up a window into relationships between some games, enumerations schemes, partitions and sturmian words. This work continues in Aviezri Fraenkel and Udi Peled’s “Harnessing the unwieldy MEX function”, Fraenkel’s “The Rat Game and the Mouse Game” and Urban Larsson’s “Restrictions of m -Wythoff Nim and p -complementary Beatty sequences”.

Advances on well-known games are represented by articles on Dots-and-Boxes by Sébastien Collette, Erik D. Demaine, Martin L. Demaine and Stefan Langerman; on Hex by Philip Henderson and Ryan Hayward; and on a variant thereof, Bidding Hex, by Sam Payne and Elina Robeva. Teigo Nakamura extends his work on Go in “Evaluating territories of Go positions with capturing races”. The analysis of Sprouts is extended by Julien LeMoine and Simon Viennot.

Tristan Cazenave’s “Monte-Carlo approximation of temperature” is about the method that has revolutionized the approach to games taken by computer scientists. J.P. Grossman and Richard J. Nowakowski show the existence of a new type of regularity in hexadecimal games.

New games with interesting structures are also introduced: MAZE, by Neil McKay, Nowakowski and Angela Siegel; Toppling Dominoes by Alex Fink,

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PREFACE

Nowakowski, Aaron Siegel and David Wolfe; and Woodpush by Cazenave and Nowakowski. Variants of Clobber are surveyed by Laurent Beaudou, Eric Duchêne and Sylvain Gravier.

The book concludes with an updated list (with discussion) of unsolved problems in combinatorial game theory, and an update to Fraenkel's bibliography of articles published on combinatorial games.

Thanks to all who made the workshop a success. A special thanks to the BIRS organization and staff. Their help leaves the participants and organizers free to concentrate on the job (fun) of research.

Lastly, a big thanks to Silvio Levy for the final preparation of this volume.

Richard J. Nowakowski (Dalhousie University)