Title	Further Results on the Game of Synchronized Triomineering
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Abstract

Keywords: Combinatorial Game, Synchronized Triomineering, decompose checkerboard.

Combinatorial Game Theory (CGT) is a branch of mathematics devoted to studying the optimal strategy in games defined as two-player, no random moves and zero-sum finite games with perfect information.

The idea of synchronism has been introduced recently in combinatorial games and so far it does not exist a general theory to study these games. The analysis of simple synchronized games is the first step toward this goal.

In Synchronized Combinatorial Games, both players play simultaneously, so it will be fair to both players. Cincotti *et al.* have been applied this idea to solved Combinatorial Games.

Synchronized Triomineering has been studied to understand if it is possible to create games with interesting outcome (G=VD, G=HD, G=VHD) in a rectangular board with triominoes. The remaining problem is to solve a general n by m rectangular board of Synchronized Triomineering using a mathematical approach.

In this thesis, the results of $n \times 7$ and $n \times 8$ checkerboard will be presented, and also with the $m + n = 13$ and $m + n = 14$ checkerboard situations. The main characteristic of the game is the possibility to decompose a board in many sub-boards making the analysis easier. To complete the study of Synchronized Triomineering and other games will help to get general theoretical results concerning synchronized combinatorial games.

In Chapter 1, we introduces the background and purpose of the game of Synchronized Triomineering, and the structure of this thesis.

In Chapter 2, we present the game of Triomineering and Synchronized Triomineering. We explain and analyze the relation and the differences between these two games in detail. Then we give some examples of the game of Synchronized Triomineering. At the end of this chapter, some results concering Synchronized Triomineering are presented.

In Chapter 3, the techniques of decomposing the checkerboard have been presented. we use this method to get the results with the $n \times 7$ and $n \times 8$ boards.

In Chapter 4, we use a program to get some results for the $m \times n$ boards with $m + n =$

13 and $m + n = 14$. And these experimental results will be also helpful to make the right hypothesis when we try to get general results for an arbitrary $n \times m$ board.

Finally, in Chapter 5, the conclusions of my research are presented.