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COMPUTER ANALYSIS OF THE 3 COLOR PROBLEM FOR V-SHAPES

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The problem of four colors is well known not only in groups of mathematicians. The main problem considered in this paper is as follows : putting V-shapes on a rectangular board in such a way to minimize a number of contact points of the same colors.

In my research I investigate only cases when rectangles, which are covered with a special kind of figures (V-Trominoes), are tinted. The only two tromino shapes are three squares in a row and the angle-shape of this puzzle.

An idea to investigate this problem arose from the Internet [1] An unsolved challenge: Can the pieces of the same color be separated so that they don't meet even at corners? Doing this with one color is easy. Total separation of two colors is very hard. All three colors? Tell us if you find such a solution.

The term tromino and its generalization, polyomino, were introduced by Solomon W. Golomb in a 1953 lecture and then in his 1954 article, "Checkerboards and polyominoes" [2]. A polyomino is a connected array of identical squares having the property that any two squares either do not touch or else meet along an entire, common edge.

If the border lines in the founded solutions of tromino form such a cross (+), then it is clear that 4 trominoes meet in the same point, i. e. the central point of the mentioned cross. It means that such a covering cannot be tinted in 3 totally separate colors. Unfortunately coverings without crosses may not be tinted in 3 colors.

The computer program elaborated in [3] that was used for Y-rectangles research was changed remarkably. Based on the performed changes, several results of statistical characters were obtained. For example, about the number of V-rectangles covering. Also several coverings of V-rectangle without crosses (+) have been found. A three color problem for rectangles with one hole (unity square) is analyzed. Fairly comprehensive statistics about the covering of the square 10×10 is given. It is planned to continue research on this and other related problems [4; 5; 6].

REFERENCES

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[5] Internet link : The Checkerboard Tromino Puzzle Norton Starr http://www.amherst.edu/ nstarr/puzzle.html

[6] Internet link : An applet of a mathematical puzzle http://www.utc.edu/%7Ecpmawata/instructor/tsukuba8.htm