

Abstract of the PhD thesis „Ramsey properties of the linear equations”

The aim of this thesis is to solve two Ramsey-type problems concerning linear equations. We will first study the equation $x_1 + \dots + x_n = y_1 + \dots + y_n + b$, where b is some positive integer. We will confirm the Conjecture of Fox and Kleitman on the degree of regularity by showing that there exists a positive integer $b=b(n)$ depending on the number of variables n such that any coloring of the natural numbers with $2n-1$ colors contains a monochromatic solution to this equation. To prove this result we generalize the structural theorem of Eberhard, Green and Manners on sets of doubling less than 4.

In the second part of the thesis we will consider the generalized Schur equation $x_1 + \dots + x_{k-1} = x_k$. We will partially answer the question of Datskovsky about the minimal number of monochromatic solutions to this equation under 2-colorings of a cyclic group, when k is an even number.

Katarzyna Taczeta