

CCSU
DEPARTMENT OF MATHEMATICAL SCIENCES

COLLOQUIUM

Friday, April 8
2:00 – 3:00 PM
Maria Sanford, Room 101

GEOMETRY AND NUMBER THEORY IN DISTANCE GRAPH PROBLEMS

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ABSTRACT

Hadwiger – Nelson problem asks for the minimum number of colors needed to color the real plane such that any two points at distance 1 are forbidden to receive the same color. The best known lower and upper bounds of are 4 and 7, with no improvement in the last 50 years. This problem can be generalized to any d -dimensional normed space. We (with Z. Füredi) have proved a lower bound of 1.2^d and a upper bound $c(d \ln d)5^d$ on this chromatic number. In this talk, we will show the lower bound using an algebraic result Frankl – Wilson inequality.

This problem has also been studied from a number theoretic point-of-view. For a given subset D of the positive integers, we want to color all the integers such that any two integers whose Euclidean distance belongs to D are forbidden to receive the same color. One of the main goals is to characterize a prescribed distance set D that induces finite chromatic number. In this talk, we approach the problem in terms of the p -adic norm. The chromatic numbers of some distance sets will be determined under p -adic norm. We discuss how the p -adic results can be connected to and complement some of the results in Euclidean norm. (The p -adic results are joint with H. Maharaj.)

For further information:

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