

B I - C O M A T H E M A T I C S C O L L O Q U I U M

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“A Polychromatic Approach to a Turán-type Problem in Finite Groups”

Monday, March 2, 2020

Talk at 4:00 – Park 338

Tea at 3:30 – Park 361, Math Lounge

Abstract:

Turán-type problems have become commonplace in the branches of mathematics known as extremal graph theory and extremal combinatorics and generally follow the outline: maximize a specified value while averting a given illegal situation. However, these problems can be applied to objects from other branches of mathematics. The work that this talk will in particular focus on applies this type of problem to the mathematical structures of abstract algebra known as finite groups. The goal is to answer this question: What is the maximum number of elements in a subset S of a finite group G which does not contain a “copy” of S ? To aid in answering this question is a coloring technique from extremal graph theory known as the polychromatic coloring. That is, polychromatic colorings can be applied to and used to determine bounds on Turán-type problems in finite groups. This talk will concentrate on determining such bounds on the desired maximum value of elements known as the Turán number belonging to the well known finite abelian group the integers modulo n , denoted \mathbf{Z}_n for all $n \geq 3$ as well as redefine and explore the problem within the context of finite nonabelian groups such as the dihedral group, denoted D_{2n} for all $n \geq 2$. (Joint work with Michael Young of Iowa State University.)

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