

Discrete Mathematics Seminar

Illinois State University

2:00–2:50 pm, November 4

Speaker: Dan Roberts, Illinois Wesleyan University

Using the Combinatorial Nullstellensatz to identify \mathbb{Z}_p -magic graphs

For the purpose of this talk, define an edge labeling of a graph G to be a function $f : E(G) \rightarrow \mathbb{Z}_k \setminus \{0\}$ where k is a positive integer. An edge labeling induces a vertex labeling $f^+ : V(G) \rightarrow \mathbb{Z}_k$ defined by $f^+(v) = \sum_{uv \in E(G)} f(u)$. If f^+ is a constant function, then we say that f is a \mathbb{Z}_k -magic labeling of G .

The driving question for this line of research is: for which values of k does there exist a \mathbb{Z}_k -magic labeling of a given graph G ? In this talk, we will see how to apply the Combinatorial Nullstellensatz to show the existence of \mathbb{Z}_p -magic labelings (p prime) for some graphs. This is a non-constructive method of showing that such labelings exist.

