

## Combinatorial Nullstellensatz and Antimagic Labelings

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In 1990, Hartsfield and Ringel conjectured that every connected graph of order at least 3 is *antimagic*, meaning there is a bijective labeling  $\phi : E(G) \rightarrow [|E(G)|]$  such that vertex sums are pairwise distinct. A measure of closeness to being antimagic is the notion of *k*-antimagic. A graph is *k*-antimagic if there is an injective labeling into  $[|E(G)| + k]$ . This looser definition can be strengthened by adding predetermined vertex weights to each vertex sum, and requiring that these weighted-vertex sums be pairwise distinct.

We use the Combinatorial Nullstellensatz (CN) to prove reducible configurations and achieve the result that all graphs having no  $K_1$  or  $K_2$  components are  $\lfloor \frac{4n}{3} \rfloor$ -weighted-antimagic, improving upon a 2012 result of Wong and Zhu. In this talk, we discuss this application of CN and related results.

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