On handicap distance antimagic labeling of regular graphs

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A handicap distance antimagic labeling of a graph $G = (V, E)$ with n vertices is a bijection $f : V \to \{1, 2, \ldots, n\}$ such that $f(x_i) = i$ and the sequence of weights $w(x_1), w(x_2), \ldots, w(x_n)$, where $w(x_i) = \sum_{x_j \in N(x_i)} f(x_j)$, forms an increasing arithmetic progression with a difference of one. We call a graph G a handicap graph if it allows a handicap distance antimagic labeling.

The study of handicap graphs has been motivated by scheduling incomplete round-robin type tournaments with certain properties and this type of labeling has received considerable attention. Initially, the existence of graphs of all feasible orders and regularities was investigated, and the existence of connected handicap graphs was also considered. Some generalizations of this labeling have also been studied. In this talk, we aim to summarize the known results, present some of the constructions, and highlight unresolved problems in handicap graphs.

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