

New bounds for the irregularity strength of graphs

Jakub Przybyło

Let G be a simple graph of order n with no isolated edges and at most one isolated vertex. For a positive integer w , a w -weighting of G is a map $f: E(G) \rightarrow \{1, 2, \dots, w\}$. An irregularity strength of G , $s(G)$, is the smallest w such that there is a w -weighting of G for which $\sum_{e: u \in e} f(e) \neq \sum_{e: v \in e} f(e)$ for all pairs of different vertices $u, v \in V(G)$. A tight result by Nierhoff says that $s(G) \leq n-1$. We will discuss our new general upper bound, which is linear in n^δ , hence better starting from a given δ upwards. In the case of the d -regular graphs, we show a better linear function of n/d as an upper bound on $s(G)$, which corresponds with the conjecture by Faudree and Lehel that $s(G) \leq n/d + c$ for some absolute constant c . The recently introduced by Ba\v{v}ca, Jendrol, Miller and Ryan total version of the problem is also discussed and supported by a number of new bounds, also linear in n^δ .