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Every graph with no isolated edges is total weight (1,5)-choosable

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Abstract

A graph $G=(V,E)$ is total weight (k,k')-choosable if the following holds: For any list assignment L which assigns to each vertex v a set $L(v)$ of k real numbers, and assigns to each edge e a set $L(e)$ of k' real numbers, there is a proper L-total weighting, i.e., a map $\phi: V \cup E \to \mathbb{R}$ such that $\phi(z) \in L(z)$ for $z \in V \cup E$, and $\sum_{e \in E(u)} \phi(e) + \phi(u) \neq \sum_{e \in E(v)} \phi(e) + \phi(v)$ for every edge $\{u, v\}$. A graph is called nice if it contains no isolated edges. As a strengthening of the famous 1-2-3 conjecture, it was conjectured in [T. Wong and X. Zhu, Total weight choosability of graphs, J. Graph Th. 66 (2011),198-212] that every nice graph is total weight (1,3)-choosable. The problem whether there is a constant k such that every nice graph is total weight $(1,k)$-choosable remained open for a decade and was recently solved by Cao [L. Cao, Total weight choosability of graphs: Towards the 1-2-3 conjecture, J. Combin. Th. B, 149(2021), 109-146], who proved that every nice graph is total weight (1,17)-choosable. In this talk, I present an improvement of this result and proves that every nice graph is total weight (1,5)-choosable.