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Neighbor sum distinguishing total chromatic number of planar graphs with maximum degree 10. (English) Zbl 1426.05051

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Summary: Given a simple graph G , a proper total- k -coloring $\phi : V(G) \cup E(G) \rightarrow \{1, 2, \dots, k\}$ is called *neighbor sum distinguishing* if $S_\phi(u) \neq S_\phi(v)$ for any two adjacent vertices $u, v \in V(G)$, where $S_\phi(u)$ is the sum of the color of u and the colors of the edges incident with u . It has been conjectured by *M. Pilśniak* and *M. Woźniak* [Graphs Comb. 31, No. 3, 771–782 (2015; Zbl 1312.05054)] that $\Delta(G) + 3$ colors enable the existence of a neighbor sum distinguishing total coloring. The conjecture is confirmed for any graph with maximum degree at most 3 and for planar graph with maximum degree at least 11. We prove that the conjecture holds for any planar graph G with $\Delta(G) = 10$. Moreover, for any planar graph G with $\Delta(G) \geq 11$, $\Delta(G) + 2$ colors guarantee such a total coloring, and the upper bound $\Delta(G) + 2$ is tight.

MSC:

05C15 Coloring of graphs and hypergraphs

05C10 Planar graphs; geometric and topological aspects of graph theory

Cited in 14 Documents

Keywords:

neighbor sum distinguishing total coloring; planar graph; combinatorial Nullstellensatz; discharging

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