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Neighbor sum distinguishing total coloring of planar graphs without 4-cycles. (English)

Zbl 1378.05073

J. Comb. Optim. 34, No. 4, 1147-1158 (2017).

Summary: Let $G = (V, E)$ be a graph and $\phi : V \cup E \rightarrow \{1, 2, \dots, k\}$ be a proper total coloring of G . Let $f(v)$ denote the sum of the color on a vertex v and the colors on all the edges incident with v . The coloring ϕ is neighbor sum distinguishing if $f(u) \neq f(v)$ for each edge $uv \in E(G)$. The smallest integer k in such a coloring of G is the neighbor sum distinguishing total chromatic number of G , denoted by $\chi''_{\Sigma}(G)$. *M. Piłśniak* and *M. Woźniak* [Graphs Comb. 31, No. 3, 771–782 (2015; Zbl 1312.05054)] conjectured that $\chi''_{\Sigma}(G) \leq \Delta(G) + 3$ for any simple graph. By using the famous Combinatorial Nullstellensatz, we prove that $\chi''_{\Sigma}(G) \leq \max\{\Delta(G) + 2, 10\}$ for planar graph G without 4-cycles. The bound $\Delta(G) + 2$ is sharp if $\Delta(G) \geq 8$.

MSC:

05C15 Coloring of graphs and hypergraphs

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

Cited in 3 Documents

Keywords:

neighbor sum distinguishing total coloring; combinatorial nullstellensatz; planar graph

Full Text: DOI

References:

- [1] Alon, N, Combinatorial nullstellensatz, Comb Probab Comput, 8, 7-29, (1999) · Zbl 0920.05026
- [2] Bondy J, Murty U (1976) Graph theory with applications. North-Holland, New York · Zbl 1226.05083
- [3] Cheng, X; Huang, D; Wang, G; Wu, J, Neighbor sum distinguishing total colorings of planar graphs with maximum degree Δ , Discrete Appl Math, 190, 34-41, (2015) · Zbl 1316.05041
- [4] Ding L, Wang G, Wu J, Yu J (2014) Neighbor sum (set) distinguishing total choosability via the Combinatorial Nullstellensatz (submitted) · Zbl 1345.05035
- [5] Ding, L; Wang, G; Yan, G, Neighbour sum distinguishing total colorings via the combinatorial nullstellensatz, Sci China Math, 57, 1875-1882, (2014) · Zbl 1303.05058
- [6] Li, H; Ding, L; Liu, B; Wang, G, Neighbor sum distinguishing total colorings of planar graphs, J Comb Optim, 30, 675-688, (2015) · Zbl 1325.05083
- [7] Li, H; Liu, B; Wang, G, Neighbor sum distinguishing total colorings of K_4 -minor free graphs, Front Math China, 8, 1351-1366, (2013) · Zbl 1306.05066
- [8] Piłśniak, M; Woźniak, M, On the adjacent-vertex-distinguishing index by sums in total proper colorings, Graphs Comb, (2013) · Zbl 1312.05054
- [9] Przybyło, J, Neighbour sum distinguishing total colorings via the combinatorial nullstellensatz, Discrete Appl Math, 202, 163-173, (2016) · Zbl 1330.05074
- [10] Qu, C; Wang, G; Wu, J; Yu, X, On the neighbour sum distinguishing total coloring of planar graphs, Theor Comput Sci, 609, 162-170, (2016) · Zbl 1331.05084
- [11] Qu C, Wang G, Yan G, Yu X (2016) Neighbor sum distinguishing total choosability of planar graphs. J Comb Optim 32(3):906-916 · Zbl 1348.05082
- [12] Song, H; Pan, W; Gong, X; Xu, C, A note on the neighbor sum distinguishing total coloring of planar graphs, Theor Comput Sci, 640, 125-129, (2016) · Zbl 1345.05035
- [13] Wang, J; Cai, J; Ma, Q, Neighbor sum distinguishing total choosability of planar graphs without 4-cycles, Discrete Appl Math, 206, 215-219, (2016) · Zbl 1335.05051
- [14] Wang G, Ding L, Cheng X, Wu J Improved bounds for neighbor sum (set) distinguishing choosability of planar graphs. SIAM Discrete Math (submitted) · Zbl 1342.05052
- [15] Wang, J; Ma, Q; Han, X, Neighbor sum distinguishing total colorings of triangle free planar graphs, Acta Math Sin Engl Ser, 31, 216-224, (2015) · Zbl 1317.05065

- [16] Wang J, Ma Q, Han X, Wang X (2016) A proper total coloring distinguishing adjacent vertices by sums of planar graphs without intersecting triangles. *J Comb Optim* 32(2):626-638 · [Zbl 1343.05066](#)
- [17] Yao, J; Yu, X; Wang, G; Xu, C, Neighbor sum distinguishing total coloring of 2-degenerate graphs, *J Comb Optim*, (2016) · [Zbl 1342.05052](#)
- [18] Yao, J; Shao, Z; Xu, C, Neighbor sum distinguishing total choosability of graphs with $\Delta = 3$, *Adv Math (China)*, 45, 343-348, (2016) · [Zbl 1363.05087](#)
- [19] Yao, J; Yu, X; Wang, G; Xu, C, Neighbour sum (set) distinguishing total choosability of Δ -degenerate graphs, *Graphs Comb*, 32, 1611-1620, (2016) · [Zbl 1342.05052](#)

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