

Wang, Jihui; Ma, Qiaoling; Han, Xue; Wang, Xiuyun

A proper total coloring distinguishing adjacent vertices by sums of planar graphs without intersecting triangles. (English) [Zbl 1343.05066](#)

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Summary: Let $G = (V, E)$ be a graph and ϕ be a total k -coloring of G using the color set $\{1, \dots, k\}$. Let $\sum_{\phi}(u)$ denote the sum of the color of the vertex u and the colors of all incident edges of u . A k -neighbor sum distinguishing total coloring of G is a total k -coloring of G such that for each edge $uv \in E(G)$, $\sum_{\phi}(u) \neq \sum_{\phi}(v)$. By $\chi''_{\text{nsd}}(G)$, we denote the smallest value k in such a coloring of G . *M. Piłśniak* and *M. Woźniak* [*Graphs Comb.* 31, No. 3, 771–782 (2015; [Zbl 1312.05054](#))] first introduced this coloring and conjectured that $\chi''_{\text{nsd}}(G) \leq \Delta(G) + 3$ for any simple graph G . In this paper, we prove that the conjecture holds for planar graphs without intersecting triangles with $\Delta(G) \geq 7$. Moreover, we also show that $\chi''_{\text{nsd}}(G) \leq \Delta(G) + 2$ for planar graphs without intersecting triangles with $\Delta(G) \geq 9$. Our approach is based on the Combinatorial Nullstellensatz and the discharging method.

MSC:

05C15 Coloring of graphs and hypergraphs

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

Cited in 5 Documents

Keywords:

neighbor sum distinguishing total coloring; combinatorial Nullstellensatz; intersecting triangles

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References:

- [1] Alon, N, No article title, *Combinatorial Nullstellensatz*. *Comb Probab. Comput.*, 8, 7-29, (1999) · [Zbl 0920.05026](#)
- [2] Bondy JA, Murty USR (1976) *Graph theory with applications*. North-Holland, New York · [Zbl 1226.05083](#)
- [3] Chen, X, On the adjacent vertex distinguishing total coloring numbers of graphs with $\Delta = 3$, *Discrete Math*, 308, 4003-4007, (2008) · [Zbl 1203.05052](#)
- [4] Ding, L; Wang, G; Yan, G, Neighbor sum distinguishing total colorings via the combinatorial nullstellensatz, *Sci China Math*, 57, 1875-1882, (2013) · [Zbl 1303.05058](#)
- [5] Ding L, Wang G, Wu J, Yu J (2014) Neighbor sum (set) distinguishing total choosability via the Combinatorial Nullstellensatz, submitted · [Zbl 1371.05078](#)
- [6] Dong, A; Wang, G, Neighbor sum distinguishing total colorings of graphs with bounded maximum average degree, *Acta Math Sin*, 30, 703-709, (2014) · [Zbl 1408.05061](#)
- [7] Huang, D; Wang, W, Adjacent vertex distinguishing total coloring of planar graphs with large maximum degree, (in Chinese), *Sci Sin Math*, 42, 151-164, (2012)
- [8] Huang, P; Wong, T; Zhu, X, Weighted-1-antimagic graphs of prime power order, *Discrete Math*, 312, 2162-2169, (2012) · [Zbl 1244.05186](#)
- [9] Kalkowski, M; Karoński, M; Pfender, F, Vertex-coloring edge-weightings: towards the 1-2-3-conjecture, *J Comb Theory*, 100, 347-349, (2010) · [Zbl 1209.05087](#)
- [10] 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](#)
- [11] Li, H; Ding, L; Liu, B; Wang, G, Neighbor sum distinguishing total colorings of planar graphs, *J Comb Optim*, (2013) · [Zbl 1325.05083](#)
- [12] Piłśniak, M; Woźniak, M, On the total-neighbor-distinguishing index by sums, *Graph Comb*, (2013) · [Zbl 1312.05054](#)
- [13] Przybyło, J, Irregularity strength of regular graphs, *Electron J Comb*, 15, 1, (2008) · [Zbl 1163.05329](#)
- [14] Przybyło, J; Woźniak, M, Total weight choosability of graphs, *Electron J Comb*, 18, p112, (2011) · [Zbl 1217.05202](#)
- [15] Seamone B (2012) The 1-2-3 conjecture and related problems: a survey. arXiv:1211.5122 · [Zbl 1297.05093](#)
- [16] Wang, W; Wang, P, On adjacent-vertex- distinguishing total coloring of K_4 -minor free graphs, *Sci China*, 39, 1462-1472, (2009)
- [17] Wang, W; Huang, D, The adjacent vertex distinguishing total coloring of planar graphs, *J Comb Opt*, (2012) · [Zbl 1319.90076](#)

- [18] Wang, GH; Yan, GY, An improved upper bound for the neighbor sum distinguishing index of graphs, *Discrete Appl Math*, 175, 126-128, (2014) · [Zbl 1297.05093](#)
- [19] Wang, GH; Chen, ZM; Wang, JH, Neighbor sum distinguishing index of planar graphs, *Discrete Math*, 334, 70-73, (2014) · [Zbl 1298.05136](#)
- [20] Wang, J; Ma, Q; Han, X, Neighbor sum distinguishing total colorings of triangle free planar graphs, *Acta Math Sin*, 31, 216-224, (2015) · [Zbl 1317.05065](#)
- [21] Wong, T; Zhu, X, Total weight choosability of graphs, *J Graph Theory*, 66, 198-212, (2011) · [Zbl 1228.05161](#)
- [22] Wong, T; Zhu, X, Antimagic labelling of vertex weighted graphs, *J Graph Theory*, 3, 348-359, (2012) · [Zbl 1244.05192](#)
- [23] Zhang, Z; Chen, X; Li, J; Yao, B; Lu, X; Wang, J, On adjacent-vertex- distinguishing total coloring of graphs, *Sci China*, 48, 289-299, (2005) · [Zbl 1080.05036](#)

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