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Minimax degrees of quasiplanar graphs with no short cycles other than triangles. (English)

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Summary: For an edge xy , let $M(xy)$ be the maximum of the degrees of x and y . The minimax degree (or M -degree) of a graph G is $M^*(G) = \min\{M(xy) \mid xy \in E(G)\}$. In order to get upper bounds on the game chromatic number of planar graphs, He, Hou, Lih, Shao, Wang, and Zhu showed that every planar graph G without leaves and 4-cycles has minimax degree at most 8, which was improved by Borodin, Kostochka, Sheikh, and Yu to the sharp bound 7. We show that every planar graph G without leaves and 4- and 5-cycles has M -degree at most 5, which bound is sharp. We also show that every planar graph G without leaves and cycles of length from 4 to 7 has M -degree at most 4, which bound is attained even on planar graphs with no cycles of length from 4 to arbitrarily large number. Besides, we give sufficient conditions for a planar graph to have M -degrees 3 and 2. Similar results are obtained for graphs embeddable into the projective plane, the torus and the Klein bottle.

MSC:

05C15 Coloring of graphs and hypergraphs

Cited in 2 Documents

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