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The acyclic edge coloring of planar graphs without a 3-cycle adjacent to a 4-cycle. (English)

Summary: An acyclic edge coloring of a graph $G$ is a proper edge coloring such that no bichromatic cycles are produced. The acyclic chromatic index $a'(G)$ of $G$ is the smallest integer $k$ such that $G$ has an acyclic edge coloring using $k$ colors. J. Fiamčík [Math. Slovaca 28, 139–145 (1978; Zbl 0388.05015)] and later N. Alon [J. Graph Theory 37, No. 3, 157–167 (2001; Zbl 0996.05050)] conjectured that $a'(G) \leq \Delta + 2$ for any simple graph $G$ with maximum degree $\Delta$. In this paper, we show that if $G$ is a planar graph without a 3-cycle adjacent to a 4-cycle, then $a'(G) \leq \Delta + 2$, i.e., this conjecture holds.

MSC:
05C15 Coloring of graphs and hypergraphs
05C10 Planar graphs; geometric and topological aspects of graph theory
05C07 Vertex degrees
05C35 Extremal problems in graph theory

Keywords:
acyclic edge coloring; planar graph; cycle; maximum degree

Full Text: DOI

References:
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