Discussiones Mathematicae
Graph Theory 37 (2017) 845–857
doi:10.7151/dmgt.1951

STRONG EDGE-COLORING OF PLANAR GRAPHS

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Abstract

A *strong edge-coloring* of a graph is a proper edge-coloring where each color class induces a matching. We denote by $\chi'_s(G)$ the *strong chromatic index* of G which is the smallest integer k such that G can be strongly edge-colored with k colors. It is known that every planar graph G has a strong edge-coloring with at most $4\Delta(G) + 4$ colors [R.J. Faudree, A. Gyárfás, R.H. Schelp and Zs. Tuza, *The strong chromatic index of graphs*, Ars Combin. **29B** (1990) 205–211]. In this paper, we show that if G is a planar graph with $g \geq 5$, then $\chi'_s(G) \leq 4\Delta(G) - 2$ when $\Delta(G) \geq 6$ and $\chi'_s(G) \leq 19$ when $\Delta(G) = 5$, where g is the girth of G.

Keywords: strong edge-coloring, strong chromatic index, planar graph, discharging method.

2010 Mathematics Subject Classification: 05C15.

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Received 16 August 2015
Revised 28 June 2016
Accepted 30 June 2016