Edge DP-coloring in planar graphs. (English) | Zbl 1460.05069


Summary: As a generalization of list coloring, DP-coloring of graphs was introduced by Z. Dvořák and L. Postle [J. Comb. Theory, Ser. B 129, 38–54 (2018; Zbl 1379.05034)]. Recently, A. Yu. Bernshteyn and A. V. Kostochka [“On the differences between a DP-coloring and a list coloring”, Mat. Tr. 21, No. 2, 181–205 (2018; doi:10.17377/mattrudy.2018.21.202); translation in Sib. Adv. Math. 29, No. 3, 183–189 (2019; doi:10.3103/S1055134419030039)] introduced edge DP-coloring of graphs which is naturally corresponding to the DP-coloring of their line graphs. Let $\chi'_{DP}(G)$ denote the edge DP-chromatic number of a graph $G$. In this paper, we prove that if $G$ is a planar graph with maximum degree $\Delta$ and without cycles of length $k$, then (1) $\chi'_{DP}(G) = \Delta$ if either $\Delta \geq 7$ and $k = 4$ or $\Delta \geq 8$ and $k = 3$; (2) $\chi'_{DP}(G) \leq \Delta + 1$ if $\Delta \geq 9$.

MSC:
05C15 Coloring of graphs and hypergraphs
05C10 Planar graphs; geometric and topological aspects of graph theory

Keywords:
edge coloring; edge list coloring; edge DP-coloring; planar graph

Full Text: DOI

References:

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