Adjacent-vertex-distinguishing proper edge colorings of planar bipartite graphs with $\Delta = 9, 10, \text{ or } 11$.

Summary: It is obtained in this paper by using of discharging method that the adjacent-vertex-distinguishing proper edge chromatic number $\chi'_a(G) \leq \Delta(G) + 1$ for any planar bipartite graph $G$ with maximum degree $\Delta(G) = 9, 10, \text{ or } 11$ and no component $K_2$. This expands a result which belongs to K. Edwards et al. [Graphs Comb. 22, No. 3, 341–350 (2006; Zbl 1107.05032)].

**Keywords:** combinatorial problems; planar bipartite graphs; adjacent-vertex-distinguishing proper edge coloring; adjacent-vertex-distinguishing proper edge chromatic number

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