NEIGHBOR SUM DISTINGUISHING TOTAL CHOOASIBILITY OF IC-PLANAR GRAPHS

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Abstract

Two distinct crossings are independent if the end-vertices of the crossed pair of edges are mutually different. If a graph $G$ has a drawing in the plane such that every two crossings are independent, then we call $G$ a plane graph with independent crossings or IC-planar graph for short. A proper total-$k$-coloring of a graph $G$ is a mapping $c : V(G) \cup E(G) \to \{1, 2, \ldots, k\}$ such that any two adjacent elements in $V(G) \cup E(G)$ receive different colors. Let $\sum_c(v)$ denote the sum of the color of a vertex $v$ and the colors of all incident edges of $v$. A total-$k$-neighbor sum distinguishing-coloring of $G$ is a total-$k$-coloring of $G$ such that for each edge $uv \in E(G)$, $\sum_c(u) \neq \sum_c(v)$. The least number $k$ needed for such a coloring of $G$ is the neighbor sum distinguishing total chromatic number, denoted by $\chi''_c(G)$. In this paper, it is proved that if $G$ is an IC-planar graph with maximum degree $\Delta(G)$, then $\chi''_c(G) \leq \max\{\Delta(G) + 3, 17\}$, where $\chi''_c(G)$ is the neighbor sum distinguishing total choosability of $G$.

Keywords: neighbor sum distinguishing total choosability, maximum degree, IC-planar graph, Combinatorial Nullstellensatz.

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References


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