NEIGHBOR SUM DISTINGUISHING TOTAL
CHOOSABILITY 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 \( c : V(G) \cup E(G) \rightarrow \{1, 2, \ldots, k\} \) 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 \( \chi''_\Sigma(G) \). In this paper, it is proved that if G is an IC-planar graph with maximum degree \( \Delta(G) \), then \( \chi''_\Sigma(G) \leq \max\{\Delta(G) + 3, 17\} \), where \( \chi''_\Sigma(G) \) 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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