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Total Chromatic Number of Δ-Claw-Free 3-Degenerated Graphs

Authors : Wongsakorn Charoenpanitseri

Abstract : The total chromatic number χ"(G) of a graph G is the minimum number of colors needed to color the elements (vertices and edges) of G such that no incident or adjacent pair of elements receive the same color Let G be a graph with maximum degree Δ(G). Considering a total coloring of G and focusing on a vertex with maximum degree. A vertex with maximum degree needs a color and all Δ(G) edges incident to this vertex need more Δ(G) + 1 distinct colors. To color all vertices and all edges of G, it requires at least Δ(G) + 1 colors. That is, χ"(G) is at least Δ(G) + 1. However, no one can find a graph G with the total chromatic number which is greater than Δ(G) + 2. The Total Coloring Conjecture states that for every graph G, χ"(G) is at most Δ(G) + 2. In this paper, we prove that the Total Coloring Conjectur for a Δ-claw-free 3-degenerated graph. That is, we prove that the total chromatic number of every Δ-claw-free 3-degenerated graph is at most Δ(G) + 2.

Keywords : total colorings, the total chromatic number, 3-degenerated, CLAW-FREE
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