

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

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Abstract : The total chromatic number $\chi'(G)$ 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 $\Delta(G)$. Considering a total coloring of G and focusing on a vertex with maximum degree. A vertex with maximum degree needs a color and all $\Delta(G)$ edges incident to this vertex need more $\Delta(G) + 1$ distinct colors. To color all vertices and all edges of G , it requires at least $\Delta(G) + 1$ colors. That is, $\chi'(G)$ is at least $\Delta(G) + 1$. However, no one can find a graph G with the total chromatic number which is greater than $\Delta(G) + 2$. The Total Coloring Conjecture states that for every graph G , $\chi'(G)$ is at most $\Delta(G) + 2$. In this paper, we prove that the Total Coloring Conjecture 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 $\Delta(G) + 2$.

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

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