

A Note on Total Chromatic Numbers of Graphs

Henjin Chi*, Indiana State University

The total chromatic number $\chi_T(G)$ of a graph G is the least number of colors needed to color the vertices and edges of G so that no two edges incident with the same vertex receive the same color, no two adjacent vertices receive the same color, and no incident edge and vertex receive the same color. If $\chi_T(G) = \Delta(G) + 1$ where $\Delta(G)$ is the maximum degree of the graph G , then G is called *Type 1*, and $\chi_T(G) \geq \Delta(G) + 2$ is called *Type 2*. A vertex coloring of a graph G with $\Delta(G) + 1$ colors is *conformable* if the number of color classes of parity different from that of $|V(G)|$ is at most $def(G)$. A graph G is conformable if it has a conformable vertex coloring. The Conformability Conjecture states that, let G be a graph satisfying $\Delta(G) \geq \frac{1}{2}(|V(G)| + 1)$, then G is Type 2 if and only if G contains a subgraph H with $\Delta(G) = \Delta(H)$ which is either non-conformable, or, when $\Delta(G)$ is even, consists of $K_{\Delta(G)+1}$ with one edge subdivided. In this talk, we give some partial results that support the Conformability Conjecture. This is a joint work with Dr. Cheng Zhao.

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