Meaningfulness of $T$-Colorings

Barry Tesman, Dickinson College

A $T$-coloring of a graph $G$ is a vertex coloring such that the absolute value of the difference between two colors assigned to adjacent vertices does not belong to a set $T$ of nonnegative integers. Given a set $T$ and an integer $k$, a graph $G$ is $T$-$k$-choosable if, for every assignment of (possibly different) lists of $k$ integers to the vertices of $G$, there exists a $T$-coloring of $G$ coloring each vertex with an element from the list assigned to that vertex. $T$-$\text{ch}(G)$ equals $k$ if $G$ is $T$-$k$-choosable but not $T$-$(k - 1)$-choosable. We consider when $T$-$\text{ch}(G)$ doesn’t change under a transformation of scale for the set $T$.

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