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DOMINATION AND COLORING IN GRAPHS

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Abstract: Graph coloring theory and domination in graphs are two major areas within graph theory which have been extensively studied. A set $S \subset V$ is said to be a dominating set of G if every vertex $v \in V - S$ is adjacent to a vertex in S. If further, S is independent, then S is called an independent dominating set of G. The minimum cardinality of an independent dominating set is called independent domination number of G and is denoted by $i(G)$.The fundamental parameter in the theory of graph coloring is the chromatic number $\chi(G)$ of a graph G which is defined to be the minimum number of colors required to color the vertices of G in such a way that no two adjacent vertices of G receive the same color. A vertex $v \in V$ is a dominator of a set $S \subseteq V$ if v dominates every vertex in S. A partition $\Pi = \{V_1, V_2, ..., V_k\}$ is called a dominator partition if every vertex $v \in V$ is a dominator of at least one V_i. The dominator partition number $\Pi_d(G)$ equals the minimum k such that G has a dominator partition of order k.
If we further require that Π be a proper coloring of G, then we have a dominator coloring of G. The dominator chromatic number $\chi_d(G)$ is the minimum number of colors required for a dominator coloring of G. We present some variations of this parameter and several interesting results and unsolved problems on them.

Keywords and Phrases: Fall-chromatic number, b-chromatic number, dominator