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COMPUTATION OF TOTAL CHROMATIC NUMBER FOR CERTAIN CONVEX POLYTOPE GRAPHS

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Abstract. A total coloring of a graph G is an assignment of colors to the elements of a graphs G such that no adjacent vertices and edges receive the same color. The total chromatic number of a graph G , denoted by $\chi''(G)$, is the minimum number of colors that suffice in a total coloring. In this paper, we proved the Behzad and Vizing conjecture for certain convex polytope graphs D_n^p, Q_n^p, R_n^p, E_n, S_n, G_n, T_n, U_n, C_n,respectively. This significant result in a graph G contributes to the advancement of graph theory and combinatorics by further confirming the conjecture's applicability to specific classes of graphs. The presented proof of the Behzad and Vizing conjecture for certain convex polytope graphs not only provides theoretical insights into the structural properties of graphs but also has practical implications. Overall, this paper contributes to the advancement of graph theory and combinatorics by confirming the validity of the Behzad and Vizing conjecture in a graph G and establishing its relevance to applied problems in sciences and engineering.

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1. Introduction

Let a graph G be finite and undirected with no loops or multiple edges. If each vertex in $V(G)$ has a degree d, the graph G is called a d -regular graph. In recent years, the study of total coloring in graphs has found important applications in various scientific and engineering domains. The total chromatic number, denoted as $\chi''(G)$, provides a valuable measure for scheduling and resource allocation problems in parallel computing, wireless networks, and telecommunication systems. By assigning distinct colors to vertices and edges such that adjacent elements receive different colors, total coloring ensures the efficient utilization of

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