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THE CHROMATIC DETOUR NUMBER OF A GRAPH

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Abstract: A set $S \subseteq V(G)$ is called a chromatic detour set of G if S is both a chromatic set and a detour set of G. The minimum cardinality of a chromatic detour set of G is called a chromatic detour number of G and is denoted by $\chi_{dn}(G)$. Some of its general properties are studied. Connected graphs of order $n \geq 2$ with chromatic detour number n or $n-1$ are characterized. It is shown that for every positive integer a and b with $2 \leq a < b$, there exists a connected graph G such that $dn(G) = a$ and $\chi_{dn}(G) = b$. It is also shown that for every positive integers a and b with $2 \leq a \leq b$, there exists a connected graph G such that $\chi(G) = a$ and $\chi_{dn}(G) = b$.

Keywords and Phrases: Chromatic detour number, chromatic number, detour number.

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1. Introduction

Throughout this paper all graphs are simple. Let $G = (V, E)$ be a graph with $V(G)$ is the vertex set of G and $E(G)$ is the edge set of G. For basic graph theoretic terminology, we refer to [2]. In a connected graph G, for any two vertices $u, v \in V(G)$, let $d_G(u, v)$ denote the length of the shortest path between u and v in G. The *diameter* of graph is the maximum distance between the pair of vertices of G. The *subgraph induced* by a set S of vertices of a graph G is denoted by $G[S]$ with $V(G[S]) = S$ and $E(G[S]) = \{uv \in E(G) : u, v \in S\}$. A set $S \subset V$ is called