

**CRITICALITY AND STABILITY OF THE GEODETIC NUMBER  
OF A GRAPH**

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**Abstract:** A subset  $S$  of  $V(G)$  of a graph  $G$  can be called a geodesic set. If each vertex in  $G$  is linked by a geodesic to another vertex in  $S$ . The geodetic number  $g(G)$  of a graph  $G$  is the minimum cardinality of a geodesic set in  $G$ . This paper studies the changing of the removal of a vertex on the geodetic number of a graph.

**Keywords and Phrases:** Geodesic set, Geodetic Number.

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### **1. Introduction**

By a graph  $G = (V, E)$  we mean a finite undirected linked graph with neither loops nor multiple edges. The order  $|V|$  and dimension  $|E|$  of  $G$  are denoted by  $p$  and  $q$  respectively. For standard terminology in graph theory we refer to the book Chartrand and Lesniak [2]. The distance  $d(u, v)$  from a vertex  $u$  to a vertex  $v$  in a linked graph  $G$  is the length of the shortest  $u - v$  path in  $G$ . A  $u - v$  geodesic is a  $u - v$  path of length  $d(u, v)$  [4]. The vertex set of a graph  $G$  is partitioned into four sets according to how their removal changing  $g(G)$ . Let  $V(G) = V_g^-(G) \cup V_g^0(G) \cup V_g^+(G) \cup S_p(G)$ , Where  $V_g^0(G) = \{v \in V(G) / g(G - v) = g(G)\}$ .