Chellathurai, S. Robinson; Vijaya, S. Padma
The geodetic domination number for the product of graphs. (English) [Zbl 1463.05458] Trans. Comb. 3, No. 4, 19-30 (2014).

Summary: A subset $S$ of vertices in a graph $G$ is called a geodetic set if every vertex not in $S$ lies on a shortest path between two vertices from $S$. A subset $D$ of vertices in $G$ is called dominating set if every vertex not in $D$ has at least one neighbor in $D$. A geodetic dominating set $S$ is both a geodetic and a dominating set. The geodetic (domination, geodetic domination) number $g(G)$ ($\gamma(G)$, $\gamma_g(G)$) of $G$ is the minimum cardinality among all geodetic (dominating, geodetic dominating) sets in $G$. In this paper, we show that if a triangle free graph $G$ has minimum degree at least 2 and $g(G) = 2$, then $\gamma_g(G) = \gamma(G)$. It is shown, for every nontrivial connected graph $G$ with $\gamma(G) = 2$ and $\text{diam}(G) > 3$, that $\gamma_g(G) > g(G)$. The lower bound for the geodetic domination number of Cartesian product graphs is proved. Geodetic domination number of product of cycles (paths) are determined. In this work, we also determine some bounds and exact values of the geodetic domination number of strong product of graphs.

MSC:
05C76 Graph operations (line graphs, products, etc.)
05C12 Distance in graphs
05C69 Vertex subsets with special properties (dominating sets, independent sets, cliques, etc.)

Keywords:
Cartesian product; strong product; geodetic number; domination number; geodetic domination number

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References:

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