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STRONG WEAK DOMINATION IN COMPLEMENTARY PRISMS

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Abstract. Let $G = (V(G), E(G))$ be a graph. If $uv \in E(G)$, then u and v dominate each other. Further, u strongly dominates v and v weakly dominates u if $deg(u) \geq deg(v)$. A set $S \subseteq V(G)$ is a strong-dominating set (*sd-set*) of G if every vertex in $V(G) - S$ is strongly dominated by at least one vertex in S. Similarly, if every vertex in $V(G) - S$ is weakly dominated by at least one vertex in S, then S is a weak-dominating set (*wd-set*). The strong (weak) domination number $\gamma_s(\gamma_w)$ of G is the minimum cardinality of an *sd-set* (*wd-set*). In this paper the strong and weak domination numbers of complementary prisms are determined and also an algorithm for computing for strong and weak domination number of any graph is given.

Keywords. Graph vulnerability, Connectivity, Network design and communication, Graph algorithms, Strong and Weak domination number, Complementary Prisms.

AMS (MOS) subject classification: 05C40, 05C85, 68M10, 68R10.

1 Introduction

The stability of a communication network, composed of processing nodes and communication links, is of prime importance to network designers. If we think of a graph as modeling a network, then various problems in networks can be studied by graph theoretical methods. Many graph theoretical parameters such as connectivity, toughness, integrity, binding number, have been used in the past to describe the stability of communication networks. The domination number is one of the measures of the graph vulnerability. The study of domination in graphs is an important research area, perhaps also the fastest-growing area within graph theory. The reason for the steady and rapid growth of this area may be the diversity of its applications to both theoretical and real-world problems. For instance, dominating sets in graphs are natural models for facility location problems in operations research.

There are several types of domination depending upon the nature of dominating set. In the following, we give the definitions strong and weak domination