

## THE NUMBER OF CC-DOMINATING SETS OF SOME GRAPHS

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**Abstract:** The aim of this paper is to study about the number of cc-dominating sets and to introduce the concept of *cc-domination polynomial* for simple finite undirected graphs. For a graph  $G$  on  $n$  vertices possessing  $d_c(G, i)$  cc-dominating sets of cardinality  $i$ , the *cc-domination polynomial* is defined as  $D_c[G; x] = \sum_{i=\gamma_{cc}(G)}^n d_c(G, i)x^i$ , where  $\gamma_{cc}(G)$  is the cc-domination number of  $G$ . We obtain some properties of  $D_c[G; x]$  and compute the same for some special graphs. Moreover, the concept of cc-domination entropy is also introduced and studied.

**Keywords and Phrases:** CC-Domination Polynomial, CC-Domination Number, Closely-connected Vertices, CC-Degree of a Vertex, CC-Isolated Vertex, CC-Domination Entropy.

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### 1. Introduction and Preliminaries

Data communication networks are effective and efficient when they amalgamate performance, reliability, and security. The reliability of network infrastructure is crucial for the smooth functioning of the network and is strongly influenced by the network's capacity to handle topological changes. As a result, neither the entire network nor significant portions of it will fail as a result of such changes and that the remaining network will resume normal operation immediately. This feature can be achieved through several techniques and a number of algorithms are already available in the literature regarding this [12].