

A Study of Domination Related Parameters in Graphs and their Applications

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We introduce a notion of Secure Co-secure, and Dual Secure Dominating sets in a graph and study their properties. Every dual secure dominating set is also a secure co-secure dominating set but not the converse. Indeed every connected graph has a secure co-secure dominating set but not necessarily a dual secure dominating set. We also discuss how perfect secure dominating sets, which have been introduced earlier by authors, lead to a partition of vertices and present methods to assign weights to edges and nodes via their role in the perfect secure dominating sets. We analyse properties of graphs which do not have a dual secure dominating set and present some open questions. We will also discuss applications of these parameters to social network analysis.

Key Words: secure domination, perfect secure domination, secure domination number, perfect secure domination number.