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A Mathematical Based Performance Comparison of TUS and Strong Triple Connected Domination Sets for MANET

Mr.R.Jothiraj¹ and Dr.A.Kathirvel²

¹*Department of Mathematics, Anand Institute of Higher Technology, Chennai, India.*

²*Department of Information Technology, Anand Institute of Higher Technology, Chennai, India.*

Email:jothirajlvp@gmail.com, ayyakathir@gmail.com

Abstract

A mobile ad hoc network is a self-created, self-organized and self-administering set of nodes connected via wireless links without the aid of any fixed infrastructure or administrator. The concept of triple umpiring system (TUS) was introduced in [1] by considering the existence of path containing any three vertices (node) of a graph G using strong triple connected domination sets. In our system each node's behavior from source to destination is closely monitored by a set of three umpires. If any misbehavior is noticed umpires flag off the guilty node from the circuit. We have proposed strong connected domination set to exemplify the basic TUS for salvaging, the circuit during disruptions in route reply and data forwarding phases. A subset S of V of a nontrivial graph G is said to be triple connected dominating set, if S is a dominating set and the induced sub graph $\langle S \rangle$ is triple connected. The minimum cardinality taken over all triple connected dominating sets is called the triple connected domination number and is denoted by $\gamma_{tc}(G)$. Similarly the minimum cardinality taken over all strong triple connected dominating sets is called the strong triple connected domination number and is denoted by $\gamma_{stc}(G)$. A strong triple connected dominating set (STDS) of graph has been proposed as a virtual backbone for routing in wireless and Ad hoc networks. We determine this number for some standard graphs and obtain bounds for general graph. Their relationships with other graph theoretical parameters are also investigated.