Convex Hull of $\gamma_{vct}$-sets in Graphs

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Authors:

R.Vasanthis, K.Subramanian

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Abstract

Let $G = (V, E)$ be an undirected, simple and connected graph. A set $C \subseteq V$ of vertices in $G$ is called a convex set if $I(C) = C$ where $I(C)$ is the set of all vertices in the $u$-$v$ geodesic path of $G$ for all $u, v \in C$. For any set $C \subseteq V$, the convex hull of $C$ denoted by $[C]$ is defined as the smallest convex subset of $V(G)$ containing $C$. Let $S$ be a minimum vertex covering transversal dominating set viz. a $\gamma_{vct}$-set. Then the convex hull of $S$ is defined as the smallest convex set containing $S$. We define the convex hull number of $G$ with respect to $\gamma_{vct}$ sets, denoted by $\text{CH}_{\gamma_{vct}}(G)$ as

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\[ \gamma(G) = \min\{|C| : C = [S] \text{ is the convex hull of } \gamma \text{-set } S \} \]

where the minimum is taken over all the vct-sets of \( G \). If \( [S] = S \), then \( S \) is called a convex \( \gamma \)-set. If \( [S] = V(G) \), then \( S \) is called a hull \( \gamma \)-set. In this paper, the convex hull of \( \gamma \)-sets and the convex hull number with respect to \( \gamma \)-sets in various graphs are analysed.

References

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Index Terms

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Keywords

minimum vertex covering transversal dominating set, convex hull number of G with respect to vct-sets, convex vct-set, hull vct- set