MOBILE RESOLVING SETS IN GRAPHS

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We consider G is a connected, undirected and simple graph without loops and multiple edges. Given two vertices $u, v \in V(G)$, the *distance* between u and v is the length of a shortest u, v-path, and is denoted by $d_G(u, v)$. The two vertices u, v are *resolved* by a vertex $x \in V(G)$ if $d_G(u, x) \neq d_G(v, x)$. In this sense, a set of vertices $S \subset V(G)$ is a *resolving set* of G if any two vertices in $V(G)$ are resolved by a vertex of S. The *metric dimension* of G is the cardinality of a smallest resolving set of G.

Given a resolving set S of a graph G occupied by a set of robots, and a vertex v of S, the robot located at the vertex v makes a *valid resolving movement*, if it moves from v to a neighbor of it (not occupied by another robot), say v', such that the new set $S \setminus \{v\} \cup \{v'\}$ occupied by the robots is also a resolving set of G. Now, we say that a set of vertices $S \subset V(G)$ is a *mobile resolving set* if every vertex of G can be visited by at least one of the robots initially placed at the resolving set S, in a sequence of valid resolving movements. The *mobile metric dimension* of G is the cardinality of a smallest mobile resolving set of G.

In this talk, we present some results on the mobile metric dimension and a new variation of it. We relate these parameters with the classical metric dimension and the resolving number of graphs and compute their values for several graph classes. Some of the results of this talk are part of the article [1].

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References

[1] C. Camacho Campos, J.C. Camacho Moreno, D. Kuziak, I.G. Yero, Z. Raza, A model of mobile robots in networks with resolvability properties, PLoS One 20(6) (2025) article #e0325565.