

**E. Galby, L. Khazaliya, F. Mc Inerney, R. Sharma, and
P. Tale : Metric Dimension Parameterized by Feedback
Vertex Set and Other Structural Parameters**

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For a graph G , a subset $S \subseteq V(G)$ is called a *resolving set* if for any two vertices $u, v \in V(G)$, there exists a vertex $w \in S$ such that $d(w, u) \neq d(w, v)$. The METRIC DIMENSION problem takes as input a graph G and a positive integer k , and asks whether there exists a resolving set of size at most k . This problem was introduced in the 1970s and is known to be NP-hard [GT 61 in Garey and Johnson’s book]. In the realm of parameterized complexity, Hartung and Nichterlein [CCC 2013] proved that the problem is W[2]-hard when parameterized by the natural parameter k . They also observed that it is FPT when parameterized by the vertex cover number and asked about its complexity under *smaller* parameters, in particular the feedback vertex set number. We answer this question by proving that METRIC DIMENSION is W[1]-hard when parameterized by the feedback vertex set number. This also improves the result of Bonnet and Purohit [IPEC 2019] which states that the problem is W[1]-hard parameterized by the treewidth. On the positive side, we show that METRIC DIMENSION is FPT when parameterized by either the distance to cluster or the distance to co-cluster, both of which are smaller parameters than the vertex cover number.