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The Strong Metric Dimension of a Graph

Let G be a connected graph. A vertex w is said to strongly resolve a pair u, v of vertices of G if there exists some shortest $u - w$ path containing v or some shortest $v - w$ path containing u. A set W of vertices is a strong resolving set for G if every pair of vertices of G is strongly resolved by some vertex of W. A smallest strong resolving set for G is called a strong basis for G and its cardinality the strong dimension of G. We begin with a motivation and an overview of this invariant and a related invariant, namely the metric dimension of a graph. We then show that the problem of finding the strong dimension of a connected graph can be transformed to the problem of finding the vertex covering number of a graph. Moreover, this invariant is shown to be NP-hard.

Joint work with J. Peters-Fransen.