

The Failed Zero Forcing Number for Trees and Möbius Ladder Graphs

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Given a graph G , the zero-forcing number of G , $Z(G)$, is the smallest cardinality of any set S of vertices on which repeated applications of the forcing rule (described below) results in all vertices being in S . The forcing rule is as follows: if a vertex v is in S , and exactly one neighbor u of v is not in S , then u is added to S in the next iteration. Zero forcing numbers have attracted great interest over the past 15 years and have been well studied. In this paper we investigate the largest size of a set S that does not force all of the vertices in a graph to be in S . This property is the failed zero-forcing number of a graph. We present a lower bound for the failed zero forcing numbers for trees based on the independence number and bounds for the failed zero forcing number of Möbius ladder graphs and similar graphs.

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