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**Isaac Brown\*** (isaac.1.brown@wsu.edu), **Brendan Miller**, **Tyler Russell** and **Christina Graves**. *Most Reliable Two-Terminal Graphs With Node Failures*.

A two-terminal graph is an undirected graph with two specified target vertices. If each vertex of such a graph fails independently with the same fixed probability (and edges are perfectly reliable), the two-terminal node reliability is the probability that the target vertices are in the same connected component in the induced subgraph of all operational nodes. A two-terminal graph is uniformly most reliable if its node reliability polynomial is greater than or equal to that of all other two-terminal graphs with the same fixed number of vertices,  $n$ , and edges,  $m$ . In this paper, we show that there is always a uniformly most reliable two-terminal graph. Furthermore, when the distance between the target vertices is restricted to be at least three, we completely classify which values of  $n$  and  $m$  produce a uniformly most reliable graph and which do not.

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