Characterization of Graphs with a Small Number of Additional Arcs in a Minimal 1-vertex Extension

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A graph G^* is a k-vertex extension of a graph G if every graph obtained from G^* by removing any k vertices contains G. k-vertex extension of a graph G with $n + k$ vertices is called minimal if among all k-vertex extensions of G with $n + k$ vertices it has the minimal possible number of arcs. We study directed graphs, whose minimal vertex 1-extensions have a specific number of additional arcs. A solution is given when the number of additional arcs equals one or two.

Key words: minimal vertex extension, exact extension, fault tolerance, graph theory.

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