Exact Methods for the Longest Induced Cycle Problem

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Our primary focus in this work is dedicated to addressing the challenge of identifying the longest induced cycle problem which is classified as NP-complete problem. For a graph $G = (V, E)$ and a subset $W \subseteq V$, the W-induced graph $G[W]$ comprises all the vertices from set W and the edges from G that connect vertices exclusively within W. The objective of the longest induced cycle problem is to determine the largest possible subset W for which the graph $G[W]$ forms a cycle.

Our work proposes three mixed-integer linear programs designed to handle the longest induced cycle problem within general graphs. Some of these models build upon the models applied by prior work focused on solving the longest induced path problem, as seen in the work of Marzo et al.[2] and Bokler et al. [3].

To demonstrate and evaluate the effectiveness of the proposed methods, we present numerical results for the three models. Furthermore, we conducted a comparison between our models and models from [1] to highlight the efficiency of our approach in comparison to existing methods.

References

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