Single step searching in weighted block graphs

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Abstract

In this paper, three types of problems for single step searching weighted graphs are investigated; the summation minimization (S-type, for short), bottleneck minimization (B-type, for short), and hybrid (H-type, for short) weighted single step graph searching problems. All three types are shown to be NP-hard but polynomial solvable for block graphs. The S-type problem is proved to be linearly equivalent to the optimum weight 2-independent set problem. Then we solve the S-type problem on a block graph G in linear time by solving the optimum weight 2-independent set problem on G. To solve the B-type problem, the first phase computes the bottleneck cost and the second phase constructs the searching plan by applying the S-type algorithm using the bottleneck cost derived in the first phase. Finally, an   time algorithm for solving the H-type problem on weighted block graphs is proposed.