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Abstract: The positive influence dominating set problem is a variant of the minimum dominating set problem, and has lots of applications in social networks. It is NP-hard, and receives more and more attention. Various methods have been proposed to solve the positive influence dominating set problem. However, most of the existing work focused on greedy algorithms, and the solution quality needs to be improved. In this paper, we formulate the minimum positive influence dominating set problem as an integer linear programming (ILP), and propose an ILP based memetic algorithm (ILPMA) for solving the problem. The ILPMA integrates a greedy randomized adaptive construction procedure, a crossover operator, a repair operator, and a tabu search procedure. The performance of ILPMA is validated on nine real-world social networks with nodes up to 36692. The results show that ILPMA significantly improves the solution quality, and is robust.

Key words: complex networks, memetic algorithm, social network, dominating set, local search.

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