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Polynomial formulation and heuristic based approach for the k-travelling repairman problem. (English) Zbl 1390.90580

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Summary: In this paper, we propose a polynomial linear integer formulation for the k-travelling repairman problem (k-TRP) and a heuristic method. The latter is a k-means clustering algorithm used to efficiently assigning of customers to k groups. Two versions of k-means algorithm are tested: the k-means in its original version and the balanced k-means, which we propose in this context. After clustering, an optimised route is generated by a polynomial linear integer formulation for each customer in his allotted cluster. Computational results prove the efficiency of the proposed approach, especially when the balanced k-means algorithm is applied.

MSC:

90C27 Combinatorial optimization
90C10 Integer programming
90C59 Approximation methods and heuristics in mathematical programming

Keywords:

polynomial mathematical formulation; integer programming; k-TRP; travelling repairman problem; balanced k-means; clustering algorithms; heuristics

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