

An efficient approach for the two-dimensional bin packing problem

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Abstract. This work addresses the problem of packing irregular pieces into two-dimensional bins, in such a way that the number of bins used is minimized. To solve the problem under study, a set of simple basic heuristics is developed, for the choice and placement of the pieces and for filling the empty spaces. In addition, a hyper-heuristic approach, aimed at effectively combining the basic heuristics, has been defined. The proposed hyper-heuristic is based on a machine learning mechanism, that dynamically selects low-level heuristics (i.e., the basic heuristics) to be applied at each iteration. The developed solution strategy is evaluated empirically on the basis of an extensive computational phase, carried out on irregular packing benchmark instances derived from the scientific literature. A comparison with the state-of-art solution approaches is also carried out. The computational results are very encouraging and underline that the proposed solution strategy outperforms the state-of-art in terms of both solution quality and efficiency

Keywords: Packing, Irregular Pieces, Hyperheuristic;

References

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