

problem is classified as NP-hard due to the large number of possible solutions generated by the combination of assigning containers to locations in the containership. These solutions are both feasible and infeasible, which increases even more the hardness of MBPP. To deal with this problem, there are several exact and heuristic approaches that are well documented in the literature. One of the most important exact methods is in the form of an integer linear programming (ILP) formulation. However, the number of variables and constraints generated by this ILP model is very large. In this chapter, we propose a new exact algorithm based on a branch and bound (B&B) approach. The main feature is the usage of an efficient representation structure of candidate solutions. We test the proposed B&B on a set of small-sized instances. Experimental results demonstrate that, within this set of instances, our B&B is competitive with respect to the ILP model from the literature.

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COMPARATIVE STUDY ON CONSTRUCTIVE HEURISTICS FOR THE VERTEX SEPARATION PROBLEM.

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The vertex separation problem (VSP) consists of finding a linear ordering of the vertices of an input graph that minimizes the maximum number of vertex separators at each cut-point induced by the ordering. VSP is an NP-hard problem whose efficient solution is relevant in fields such as very large scale integration design, computer language compiler design, graph drawing and bioinformatics. In the literature reviewed, we found several exact algorithms and two metaheuristics based on the variable neighborhood search approach. These metaheuristics are currently the best stochastic algorithms for solving VSP. One of the key points of their efficiency is the usage of heuristics to construct a high-quality initial solution that considerably improves the algorithm performance. In this chapter we augment the literature on VSP by proposing a new set of heuristics. The proposed constructive heuristics are compared with the best ones found in the state-of-the-art and with random solution generator (Rnd). Experimental results demonstrate the importance of constructive algorithms. The best constructive improves Rnd by 89.96 % in solution quality.

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EVOLUTION OF KERNELS FOR SUPPORT VECTOR MACHINE CLASSIFICATION ON LARGE DATASETS.

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Kernel selection is a main factor in the designing of support vector machines. Evolutionary techniques have been applied to select the fittest kernel for specific classification problems. However, technical issues emerge when attempting to apply this methodology to deal with large datasets. On the other hand, a new method for improving the training time of support vector machines was recently developed. In this chapter, the new method is integrated in a kernel evolution scheme. Ten benchmark datasets are tested. Results indicate that the new method speeds up the evolution process when datasets are greater than 1000 instances.

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TRAJECTORY METAHEURISTICS FOR THE INTERNET SHOPPING OPTIMIZATION PROBLEM

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In this chapter we propose two trajectory-based heuristics, particularly Simulated Annealing and Tabu Search, to solve instances of the Internet Shopping Optimisation Problem (ISOP). Since these metaheuristics are relatively less costly in terms of computational resources such as CPU time and memory, compared to population-based metaheuristics, but with a better performance than simpler heuristics, its use in the context of internet shopping is relevant. In such context the user of the service expects good quality solutions, while the provider wants to maintain the use of resources at a low level.

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