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The Hybrid Metaheuristic DM-GRASP:
New Applications and Parallelization

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Metaheuristics are among the most important tools for solving computationally intractable problems efficiently. Previous research results demonstrated that the hybridization of these methods with other techniques has the potential to improve their performance and robustness. Recently, a hybrid version of the metaheuristic GRASP that incorporates a data mining process, called DM-GRASP, was proposed. The application of this method to the Set Packing Problem achieved promising results.

One of the goals of this work was to evaluate the performance of DM-GRASP in the context of other Combinatorial Optimization problems. Two problems were considered: the maximum diversity problem and the problem of server replication for reliable multicast transmission. The results demonstrated that the method is capable of achieving better solutions than the original GRASP. In addition, the execution times are significantly reduced.

The evolution of parallel and distributed computing technology provided a great increase in computational power available to applications. Another contribution of this work is the evaluation of parallel implementations of DM-GRASP. Parallel versions of the hybrid metaheuristic were developed for both problems mentioned earlier. Experimental results evidenced the method's scalability in relation to the number of processors used, especially when a dynamic load balancing strategy is implemented.