A 2-level metaheuristic for the set covering problem

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Metaheuristics are solution methods which combine local improvement procedures and higher level strategies for solving combinatorial and nonlinear optimization problems. In general, metaheuristics require an important amount of effort focused on parameter setting to improve its performance. In this work a 2-level metaheuristic approach is proposed so that Scatter Search and Ant Colony Optimization act as "low level" metaheuristics, whose parameters are set by a "higher level" Genetic Algorithm during execution, seeking to improve the performance and to reduce the maintenance. The Set Covering Problem is taken as reference since is one of the most important optimization problems, serving as basis for facility location problems, airline crew scheduling, nurse scheduling, and resource allocation.

Ant colony optimization

Genetic algorithm

Metaheuristics

Scatter search

Set covering problem