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Greedy Randomized Adaptive Search Procedures: Advances, Hybridizations, and Applications

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Abstract

GRASP is a multi-start metaheuristic for combinatorial optimization problems, in which each iteration consists basically of two phases: construction and local search. The construction phase builds a feasible solution, whose neighborhood is investigated until a local minimum is found during the local search phase. The best overall solution is kept as the result. In this chapter, we first describe the basic components of GRASP. Successful implementation techniques are discussed and illustrated by numerical results obtained for different applications. Enhanced or alternative solution construction mechanisms and techniques to speed up the search are also described: alternative randomized greedy construction schemes, Reactive GRASP, cost perturbations, bias functions, memory and learning, local search on partially constructed solutions, hashing, and filtering. We also discuss implementation strategies of memory-based intensification and post-optimization techniques using path-relinking. Hybridizations with other metaheuristics, parallelization strategies, and applications are also reviewed.



Within this Chapter

1. Introduction
2. Construction of the Restricted Candidate List
3. Alternative Construction Mechanisms
4. Path-ReLinking
5. Extensions
6. Parallel GRASP
7. Applications
8. Concluding Remarks
9. References
10. References

Related Content



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