Abstract

The multi-objective integer programming problems are considered time consuming. In the past, mathematical structures were used that can get benefits of high processing powers and parallel processing. A general approach to generate all non-dominated solutions of the multi-objective integer programming (MOIP) Problem is developed. In this paper, a hybridization of two different swarm intelligent approaches, stochastic diffusion search, and particle swarm optimization techniques is presented for solving integer multi-objective problems. The hybrid implementation allows us to avoid certain drawbacks and weaknesses of each algorithm, which means that we are able to find an optimal solution in an acceptable computational time. Our hybrid implementation allows the MOIP algorithm to reach the optimal solution in a considerably shorter time than is needed to solve the model using the entire dataset directly within the model. Our hybrid approach outperforms the results obtained by each technique separately. It is able to find the optimal solution in a shorter time than each technique on its own, and the results are highly competitive with the state-of-the-art in large-scale optimization. Furthermore, according to our results, combining the PSO with SDS approach for solving IP problems appears to be an interesting research area in combinatorial optimization.
A Hybrid Swarm Intelligence Technique for Solving Integer Multi-objective Problems

References


Index Terms

Computer Science Algorithms

Keywords

Swarm Intelligence Integer programming Multi-objective Stochastic Diffusion Search and Particle Swarm Optimization