

A comparison of three recent nature-inspired metaheuristics for the set covering problem

Crawford B.

Soto R.

Peña C.

Riquelme-Leiva M.

Torres-Rojas C.

Misra S.

Johnson F.

Paredes F.

The Set Covering Problem (SCP) is a classic problem in combinatorial optimization. SCP has many applications in engineering, including problems involving routing, scheduling, stock cutting, electoral redistricting and others important real life situations. Because of its importance, SCP has attracted attention of many researchers. However, SCP instances are known as complex and generally NP-hard problems. Due to the combinatorial nature of this problem, during the last decades, several metaheuristics have been applied to obtain efficient solutions. This paper presents a metaheuristics comparison for the SCP. Three recent nature-inspired metaheuristics are considered: Shuffled Frog Leaping, Firefly and Fruit Fly algorithms. The results show that they can obtain optimal or close to optimal solutions at low computational cost. © Springer International Publishing Switzerland 2015.

Firefly algorithm

Fruit fly algorithm

Metaheuristics

Set Covering Problem

Shuffled Frog Leaping Algorithm

Algorithms

Bioluminescence

Combinatorial optimization

Computational complexity

Fruits

Heuristic algorithms

Firefly algorithms

Fruit flies

Meta heuristics

Set covering problem

Shuffled frog leaping algorithm (SFLA)

Optimization