Heuristic feasibility and preprocessing for a set covering solver based on firefly optimization

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The set covering problem is a classic benchmark that has many real applications such as positioning of communications systems, logical analysis, steel production, vehicle routing, and service allocation in general. In this paper, we present an improved firefly algorithm to the efficient resolution of this problem. The firefly algorithm is a recent metaheuristic based on the flashing characteristics of fireflies that attract each other by using their brightness. We improve this approach by incorporating pre-processing and an heuristic feasibility operator resulting in an interesting solver able to clearly outperform the previously reported results obtained from firefly algorithms.

Firefly Algorithm

Metaheuristic

Set Covering Problem

Algorithms

Amphibious vehicles

Artificial intelligence

Benchmarking

Bioluminescence

Heuristic algorithms

Optimization

Social networking (online)

Steelmaking

Communications systems

Firefly algorithms

Logical analysis

Metaheuristic

Real applications

Service allocations

Set covering problem

Steel production

Fire protection