

Cat swarm optimization with different transfer functions for solving set covering problems

Crawford B.

Soto R.

Berrios N.

Olguín E.

Misra S.

This work presents a study of a new binary cat swarm optimization. The cat swarm algorithm is a recent swarm metaheuristic technique based on the behaviour of discrete cats. We test the proposed binary cat swarm optimization solving the set covering problem which is a well-known NP-hard discrete optimization problem with many practical applications, such as: political districting, information retrieval, production planning in industry, sector location and fire companies, among others. To tackle the mapping from a continuous search space to a discrete search space we use different transfer functions, S-shaped family and V-shaped family, which are investigated in terms of convergence speed and accuracy of results. The experimental results show the effectiveness of our approach where the binary cat swarm algorithm produce competitive results solving a portfolio of set covering problems from the OR-Library. © Springer International Publishing Switzerland 2016.

Binary cat swarm optimization

Metaheuristic

Set covering problem

Algorithms

Bins

Factory automation

Problem solving

Production control

Transfer functions

Zoning

Convergence speed

Discrete optimization problems

Meta-heuristic techniques

Metaheuristic

Production Planning

Set covering problem

Swarm algorithms

Swarm optimization

Optimization