A firefly algorithm to solve the manufacturing cell design problem

Soto R.

Crawford B.

Lama J.

Paredes F.

The Manufacturing Cell Design Problem (MCDP) consists in creating an optimal design of production plants, through the creation of cells grouping machines that process parts of a given product. The goal is to reduce costs and increase productivity by minimizing movements and exchange of material between these cells. In this paper, we present a Firefly Algorithm (FA) to tackle this problem. The FA is a recent bio-inspired metaheuristic based on the mating behavior of fireflies that employ its flashing capabilities to communicate with each other or attract potential prey.We incorporate efficient transfer and discretization methods in order to suitable handle the binary domains of the problem. Interesting experimental results are illustrated where several global optimums are reached for a set of 90 well-known MCDP instances. © Springer International Publishing Switzerland 2016.

Firefly Algorithm

Manufacturing Cell Design

Metaheuristics

Optimization

Algorithms

Artificial intelligence

Bioluminescence

Cells

Cytology

Design

Discrete event simulation

Fire protection

Flexible manufacturing systems

Intelligent systems

Manufacture

Product design

Discretization method

Firefly algorithms

Global optimum

Mating behavior

Meta heuristics

Minimizing movements

Optimal design

Production plant

Optimization