

Solving the manufacturing cell design problem via invasiveweed optimization

Soto R.

Crawford B.

Castillo C.

Paredes F.

Manufacturing plants are commonly organized in cells containing machines that process different parts of a given product. The Manufacturing Cell Design Problem (MCDP) aims at efficiently organizing the machines into cells in order to increase productivity by minimizing the inter-cell moves of parts. In this paper, we present a new approach based on Invasive Weed Optimization (IWO) for solving such a problem. The IWO algorithm is a recent metaheuristic inspired on the colonization behavior of the invasive weeds in agriculture. IWO represents the solutions as weeds that grow and produce seeds to be randomly dispersed over the search area. We additionally incorporate a binary neighbor operator in order to efficiently handle the binary nature of the problem. The experimental results demonstrate the efficiency of the proposed approach which is able to reach several global optimums for a set of 90 well-known MCDP instances. © Springer International Publishing Switzerland 2016.

Invasive Weed Optimization

Manufacturing Cell Design

Metaheuristics

Optimization

Artificial intelligence

Bins

Cells

Cellular manufacturing

Cytology

Flexible manufacturing systems

Intelligent systems

Manufacture

Optimization

Global optimum

Inter-cell moves

Invasive weed

Invasive weed optimization

Manufacturing plant

Meta heuristics

Metaheuristic

New approaches

Problem solving