عنوان مقاله:

SEQUENCE OF DRILLING OPERATIONS OF A RECTANGULAR MATRIX OF HOLES USING MODIFIED SHUFFLED FROG LEAPING ALGORITHM

محل انتشار:

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خلاصه مقاله:

Several industrial products such as moulds, dies, engine block, automotive parts, etc., require machining of a large number of holes. Similarly, applications like boiler plates, food-business processing separator's, printed circuit boards, drum and trammel screens, etc., consist of a matrix of a large number of holes. Many machining operations, such as drilling, enlargement, tapping, or reaming, are needed to achieve the final sizes of individual holes, resulting in a variety of possible sequences to complete the hole-making operations. The major issue involved in hole-making operations is the tool travel time. It is often vital to determine the optimal sequence of operations so that the overall processing cost of hole-making operations can be minimized. In this work, thus an attempt is made to minimize the total tool travel of hole-making operations by using a relatively new optimization algorithm known as modified shuffled frog leaping for the determination of the optimal sequence of operations. Modification is made in the present shuffled frog-leaping algorithm by using three parameters with their positive values in order to widen the search capability of the existing algorithm. This paper considers three case studies of a rectangular matrix of holes to explain the proposed procedure. The outcomes of optimization with a modified shuffled frog-leaping algorithm are compared to those obtained with the genetic algorithm and the ant colony algorithm. Additionally, the higher dimensional problem of ۲۰ x ۲۰ rectangular matrix of holes is considered in this work.

کلمات کلیدی:

Hole-making operations, Injection mould, modified shuffled frog leaping algorithm, advanced optimization techniques, Tool path planning