Grouping both machines and parts in cellular technology by Genetic Algorithm

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Abstrak

Cellular manufacturing is a practical aspect of grouping technology in where similar parts and dissimilar machines are grouped into cells to exploit the cost-effectiveness of mass production and flexibility of job shop manufacturing. In this research, a Genetic Algorithm (GA) approach is developed to solve the grouping problem in cellular manufacturing systems. The grouping problem of both machines and parts is formulated as a multi-objective mathematical program; first, minimizing intra-cell and inter-cell movement costs and second, maximizing the importance of allocating the parts to the cells with regards to the location of the machines. The weight of each part for each machine is calculated by Analytical Hierarchy Process. Then, the multi-objective GA has been solved by allocating weights to objectives. The results have also been compared with the results of heuristic Jaccard Coefficient method.