Abstract

Cellular Manufacturing is an important application of group technology principles and is suitable in a medium variety medium volume production environment. It is concerned with the production of part types in a flow line manner by dividing the production system into manufacturing cells. In cellular manufacturing system (CMS) design, cell formation is one of the most important steps which contain identification of machine cells and part families. Usually, minimization of intercell movements is the criteria for CMS design. In this paper, we introduce a heterogeneity concept which indicates diversity of machines in a cell and it is measured based on the machine assigned to a cell and machines required for processing of parts visiting the cell. A non-linear integer programming model for the design of manufacturing cells is proposed in this paper to minimize the heterogeneity of cells formed for the given part-machine incidence matrix. The solution is found through a heuristic procedure based on a genetic algorithm coded in MATLAB. The approach produced solution with a grouping efficacy equal to or better than some of the previous approaches based on seven problems.

Index Terms
Computer Science Operations Research

Keywords
Cellular manufacturing systems Heterogeneity of cells Part-machine incidence matrix Genetic algorithm