Minimizing the total number of exceptional elements in Group Technology cell formation with multiple process routings

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ABSTRACT

In this paper we consider the cell formation problem in group technology manufacturing with multiple process routings for a part. Two integer linear programming models have been constructed. One is p-median model which is a modification of Kusiak's model. By using the generalized machine similarity coefficient, the new model has much smaller number of binary variables than Kusiak's model which uses the similarity coefficient defined between routings of parts. The other is an extension of Boctor's model which attempts to directly minimize the total number of exceptional elements in group technology problem with a single routing for a part. The extended model has special structure in which integer restriction of a number of binary variables can be relaxed. The result of comparison among the models shows that in terms of the number of binary variables, the new model attempting to directly minimizing the total number of exceptional elements is small enough to implement even for moderately large-sized problem.