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A Priority Based Imbalanced Time Minimization Assignment Problem: An Iterative Approach

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Abstract : This paper discusses a priority based imbalanced time minimization assignment problem dealing with the allocation of n jobs to m < n persons in which the project is carried out in two stages, viz. Stage-I and Stage-II. Stage-I consists of n1 (< m) primary jobs and Stage-II consists of remaining (n-n1) secondary jobs which are commenced only after primary jobs are finished. Each job is to be allocated to exactly one person, and each person has to do at least one job. It is assumed that nature of the Stage-I jobs is such that one person can do exactly one primary job whereas a person can do more than one secondary job in Stage-II. In a particular stage, all persons start doing the jobs simultaneously, but if a person is doing more than one job, he does them one after the other in any order. The aim of the proposed study is to find the feasible assignment which minimizes the total time for the two stage execution of the project. For this, an iterative algorithm is proposed, which at each iteration, solves a constrained imbalanced time minimization assignment problem to generate a pair of Stage-I and Stage-II times. For solving this constrained problem, an algorithm is developed in the current paper. Later, alternate combinations based method to solve the priority based imbalanced problem is also discussed and a comparative study is carried out. Numerical illustrations are provided in support of the theory.

Keywords : assignment, imbalanced, priority, time minimization
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