

عنوان مقاله:

Modeling Diminishing Returns in Multi-Mode Resource- Constrained Project Planning by Genetic Algorithms

محل انتشار:

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خلاصه مقاله:

In this paper, we use an efficient genetic algorithm to solve a linear integer model for multi-mode resource-constrained project scheduling (MRCPS) involving in diminishing returns from increasing an allocation of resources. In the proposed model, single resource allocations is applied to a continuous state over the resource ranges of availability. Similar to that, the activities can be performed in one of several different ways reflecting multiple activity scenarios or modes. A key feature of the proposed model is to directly incorporate the relationship between the duration of an activity and the allocated resources into the constraints of the model. In most of real-world conditions, activities are a nonlinear function of requirement resources in which the function type can be varied from an activity to other. As a result, the proposed model becomes a nonlinear model essentially. In mentioned conditions, the model is so difficult to solve optimally in a reasonable amount of time. Thus, a linear approximation model is developed and solved optimally by branch and bound method. The main disadvantage of linear approximation model is its loss of accuracy. Therefore, the linear approximation model is solved by a developed genetic algorithm. The computational results from implementation of GA are compared with the optimum solution showing that the genetic algorithm can be an effective approach for multi-mode project scheduling problems with the diminishing returns and continuous state, especially for large-scale problems.

کلمات کلیدی:

Multi-Mode resource-constrained project scheduling, Genetic algorithms, Integer programming

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