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クリティカルチェーン法の枠組みにおいて効率的に

資源を活用するためのスケジューリング方法

SCHEDULING METHODS TO UTILIZE RESOURCES EFFECTIVELY
IN THE CRITICAL CHAIN METHOD



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Abstract

We propose approximate methods and a strict method for resolving resource conflicts in the critical chain project management method. The critical chain project management method is a technique to shorten the duration time of a given project, and to decrease the delay rate in the overall project. In the critical chain project management method, the uncertainty of the duration time of each task and time buffers are assumed. This method consists of (1) identifying tasks of a project, (2) collection of time margins, (3) resolution of resource conflicts, (4) classifying tasks according to critical or non-critical tasks, and (5) insertion of time buffers. Effective approaches for four of the five processes already exist. For the remaining unresolved process (3) resolution of resource conflicts, an effective method has yet to be proposed. Hence, we develop three simple approximate solving methods, and improve these using a local search or a genetic algorithm. Methods based on the earliest and latest start times are used. The local search method performs a basic search by swapping the processing order of two arbitrary tasks. The genetic algorithm performs a search by crossing the three solutions of the three simple approximate solving methods. Through numerical experimentation, we found that these solving methods are practical. The average value of the solutions obtained by the three simple methods was improved up to approximately 18% if a local search is used for a 100-task project, while improved approximately 7% if a genetic algorithm is used. However, the computational time of the genetic algorithm is faster than that of the local search. The strict method could find the optimal solution if the number of tasks is smaller than 20.

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研究業績一覧

・ 紀要

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