

論 文 概 要

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論文題目	A Framework for Inter-Project Critical Chain Management based on Max-Plus Linear Representation (Max-Plus 線形表現に基づくクリティカルチェーン複数プロジェクト管理手法)		

(概要) (300字程度)

This research has proposed a scheduling method on project management by using Max-Plus Linear (MPL) system. To provide a succinct framework which can handle a large-scale project system and take into account the uncertainties of task durations, we apply the concept of Critical Chain Project Management (CCPM) based on the MPL Representation.

CCPM is a well-known method for planning and managing projects. The CCPM provides a method to reduce the processing time and insert time buffers for absorbing uncertainties of task durations. On the other hand, Max-Plus algebra is an easy-to-use tool for describing a certain class of discrete event systems, such as manufacturing systems, transportation systems, and project management. Recently, some applications of the CCPM based on the MPL representation was successfully developed with two technical assumptions that the system consists of a single project and that the input times are equal to zero. However, the input times may be affected by uncertainties causing the change of the critical chain and the determination of the buffers.

In this study, we improve the previous framework to handle a system with various input times using the MPL representation of input/task constraints. Moreover, we extend the framework to a multi-project system with mutual dependence, proposing a new approach to identify the constraints of the entire system considered in both each of individual projects and the relationship among them. Since a frequent monitor of the consumption of the time buffers is another ingredient of the success of CCPM, we also propose a procedure for frequently surveying the rates of consumed buffers and the elapsed time, enabling the managers to make an effective decision on project scheduling.

As a result, the proposed CCPM-MPL framework can monitor and manage the schedule of a complex system with multiple interdependent projects and various input times. This would be beneficial to conduct further researches for extending the framework to other kinds of DESs and for considering the external uncertainties in the practical cases.

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