

Application to Linear Graph Theory for CAE of Power Transmission Mechanism

*Keiichi WATANUKI**, *Hideyuki OTANI**, *Yoshio ISHIKAWA** and *Tomoaki YANO*** At the present time, the machines with high accuracy and performance tend to be designed by CAE methods. But suitable and useful CAE methods are not established for all machine parts and elements. Thus, we must derive easy and useful methods for each machine part. This report deals with a new method using linear graph theory as one CAE method and analyzes the results of dynamic behaviour concerning power transmission mechanism. By this method, addition and deletion of machine elements are made flexibly, and performances of the system are analyzed rapidly. So this method is effective for extensive machine design.

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Knowledge and Database Systems for Process Planning

Kyoji KAWAGOE and *Yasuyuki MAEDA* The new architecture of knowledge and database management systems for process planning systems is presented. Recent progress in knowledge engineering technology gradually makes it possible to realize an automatic design system. Several researches aim at realization of an expert system for process planning, which needs an efficient management of a large amount of knowledge and data, and an inference mechanism pertinent to geometric and machining processing. To solve the first problem of them, we observed the knowledge and data used in process planning, then concluded the necessity of integration between them in a unified way. We introduced an extended Entity-Relationship model for this point. This model is composed of both entity and relationship types. The point of using this model to represent both

knowledge and data is that most of the knowledge is associated with relationships. We are currently implementing a process planning system based on the above model for knowledge and data representation.

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ITV Camera Head for Teleoperation Activated by the Eye Motion of the Operator

*Hiroo IWATA**, *Takemochi ISHII*** and *Michitaka HIROSE*** An ITV camera has an important role in teleoperation. This paper describes a method of controlling an ITV camera head according to the eye motion of the operator. The camera head has 3 degrees of freedom. Controllers of the camera head are distributed and built into the mechanical parts of each joint, so that they can be free from heavy wires. The eye motion of the operator is measured by image processing of the operator's face. An image of the face is obtained by a video camera mounted on the monitor display. The camera head rotates in the same direction as the visual line of the operator, so that the target is displayed at the center of the monitor display.

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Evaluation of System Configuration on FMC for Metal Cutting

Chin-Ming Hu and *Yoshimi Ito* In the FMS of next generation, its system configuration is to be of modular type, in which the basic module is that of FMC. This FMC enables the FMS technology to be available for town and medium-size industries. To cope with such trends surrounding the FMC, it is now required of establishing a design theory of special-purpose FMC and also a standardization method of FMC. In this paper, thus, the similarity evaluation method of the FMC for

metal cutting has been investigated to propose a classification method of FMC. The similarity evaluation proposed here puts its main stress on the system configuration, especially on the characteristics of the system component and work flow pattern, and to enable the evaluation procedure to be simplified, the FMC is represented with the directed graph. Through some trial applications, it can be verified that the proposed method is reliable and effective from the practical point of view.

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