# Optimized Management on Mathematical Planning and Structure Modeling

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Research Fields :    Systems Engineering

Keywords :    Software Center, Data Structure, Search Tree, Modeling of Structure

## ● Research Topics

This study presents sparse and large-scale data structure for management software system on mathematical planning.  A lot of studies previously researched are discussed from the various points of view, which mean information systems, software engineering, artificial intelligence and knowledge information systems.

The study proposes three kinds of sparse data structures, that is, a matrix with rows and columns, the spread sheets and search trees. 1) The first structure is used for the constrained load ( power ) flow of practical electric power systems.  This is an optimization problem which obtains a feasible solution with considering priority orders. The problem becomes large-scale in applying to real cases.  2) The second exploits display expression of too large-scale spread sheet with sparse data structure to show the whole sheet on a single screen.  The display expression of a computer only shows cells with data after automatically dropping other cells of no data.  3) The third is for desirable constraint satisfaction in the field of artificial intelligence.  The constraint satisfaction means large-scale assignment problems with priority orders.  The solution technique is to search state space by using several search trees.

## ● Research Theme in the future

・Study on data structure for large-scale constraint satisfaction

・Development of an approximation method using search trees and its large-scale software for solving large-scale constraint satisfaction and assignment problems with priority order

・Study on developing the software using the incremental method by constant time for solving (modified) job shop scheduling problems

## ● Research Theme for Collaboration

・Suggestion on information network and software center of Japan

・Study on display expression of sparse data structure for a large-scale spread sheet

・Study on repeated bids for many articles by combinatorial auction

・Study on logistics and facility location for cities in five prefectures of Chugoku region

## ● Results in Collaboration with Society

・Study on constrained load ( power ) flow of electric power systems, and on the development of its large-scale software

・Study on competitive voting and budget distributing algorithm for selecting the 21st century COE programs

・Lecturing on "Basic Computer Science" and "Software Engineering" in the Software Center of Hiroshima