

Development of High-Speed and Highly Accurate Numerical Analysis Technology of Rotating Machine by 3-D Finite Element Method

Project Representative

Masanori Nakamura

TOYO DENKI SEIZO K.K.

Authors

Masanori Nakamura ^{*1}, Yoshihiro Kawase ^{*2}, Tadashi Yamaguchi ^{*2}, Tomohito Nakano ^{*2}, Shingo Ukai ^{*2}, Noriaki Nishikawa ^{*3}, Hitoshi Uehara ^{*3}

* 1 TOYO DENKI SEIZO K.K.

* 2 Gifu University

* 3 Japan Agency for Marine-Earth Science and Technology

Abstract

It is desired that the efficiency of rotating machines is improved for environmental problems.

In the field of numerical analysis of the magnetic field for rotating machines, the large-scale parallel computing is still in an early stage of investigation. In general, the three-dimensional Finite-Element Method (3-D FEM) with the edge elements is used for the magnetic field analysis. The parallel computing technique based on the Domain Decomposition Method (DDM) for the edge element method has not been studied yet.

The aim of this project is to perform the large scale numerical simulation of the magnetic field for the rotating machines. In this year, we have developed the DDM for the 3-D FEM with the edge elements.

We report here the outline of the developed method and the performance of the proposed method running on the Earth Simulator.

Keywords : rotating machine, magnetic field analysis, finite element method with edge elements, domain decomposition method