MATHEMATICAL AND NUMERICAL ASPECTS OF ALGORITHMS RELATED TO COMPUTATIONAL ELECTROMAGNETISM

1700 - NUMERICAL METHODS AND ALGORITHMS IN SCIENCE AND ENGINEERING

TAGAMI, DAISUKE[*1], KAWAI, HIROSHI[*2], OGINO, MASAO[*3], SUGIMOTO, SHIN-ICHIRO[*4], AND TAKEI, AMANE[*5]

[*1] Kyushu University
744 Motooka, Nishi-ku, Fukuoka 819-0395, JAPAN, tagami@imi.kyushu-u.ac.jp

[*2] Toyo University
2100 Kujirai, Kawagoe-shi, Saitama 350-8585, JAPAN, kawai063@toyo.jp

[*3] Daido University
10-3 Takiharu-cho, Minami-ku, Nagoya 457-8530, JAPAN, m-ogino@daido-it.ac.jp

[*4] Hachinohe Institute of Technology
88-1 Ohbiraki, Myo, Hachinohe, Aomori 031-8501, JAPAN, sugimoto@hi-tech.ac.jp

[*5] University of Miyazaki
1-1 Gakuen Kibanadai-Nishi, Miyazaki, JAPAN, takei@cc.miyazaki-u.ac.jp

Key words: computational electromagnetism, numerical analysis, novel numerical scheme

ABSTRACT

Computational electromagnetism plays important roles to design the electric facilities and to assess the influence of electromagnetic fields; for example, transformer, motor, and hyperthermic potentiation. However, as the ability of computers progresses and the demand of more precise approximation, the number of Degrees Of Freedom (DOF) of computational models derived from conventional discretizations becomes larger even in case of adaptive mesh refinements. In this minisymposium, we discuss on the accuracy and efficiency of novel numerical schemes of electromagnetic field problems from both mathematical and engineering points of view. We have some possibilities of novel numerical schemes, which are discussed in this minisymposium. First, we discuss efficient numerical schemes to compute directly such large scale computational models within the required computational costs, for example, based on Domain Decomposition Methods (DDM) with parallel computations; see [1]. Second, we discuss efficient numerical schemes reducing the problem size without deteriorating accuracy, which can be, for example, realized by Model Order Reduction (MOR) methods; see [2]. Third, we welcome to discuss novel schemes based on other strategies not mentioned above.

REFERENCES

[1] TAKEI, A., OGINO, M., AND SUGIMOTO, S.: *IEEE Trans. Magn.*, **54** (2018).

[2] SATO, Y. AND IGARASHI, H.: *IEEE Trans. Magn.*, **52** (2016).