

High-performance iterative solution of large dense systems from electromagnetics

B. Carpentieri*

We present results of a joint research effort between CERFACS, CERMICS-INRIA and EADS-CCR on the design of high-performance iterative techniques for solving large-scale electromagnetic problems expressed in an integral (EFIE) formulation on distributed memory computers. In this talk, we discuss the different components of a robust iterative solution in that context, that is the design of efficient and parallel preconditioners, the implementation of the multilevel FMM method, and the choice of the Krylov solver including extensions to the case of multiple right-hand sides. We present numerical experiments on a set of realistic industrial problems from radar cross section calculation provided by EADS to illustrate the potential of our method for solving large-scale applications in electromagnetism. Finally, we present some preliminary results of applications in acoustics.

*Parallel Algorithms Project - CERFACS, 42, avenue G. Coriolis, 31057 Toulouse Cedex 01, France e-mail:carpentieri@cerfacs.fr