APPLICATIONS

Distributed Computational Electromagnetics Systems

Gang Cheng[1] (gcheng@npac.syr.edu), Kenneth A. Hawick[1] (hawick@npac.syr.edu), Gerald Mortensen[2] and Geoffrey C. Fox[1]

"Parallel Implementation of a MoM-based Computational Electromagnetics Application using BLACS and ScaLAPACK". Paper accepted at the 7th SIAM conference on Parallel Processing for Scientific Computing, San Francisco, CA, 15-17, 1995.

Far-Field Electromagnetic Scattering from a Sphere, computed by the ParaMoM MPP code.
http://www.npac.syr.edu/users/gcheng/CEM/home.html.

[1]Northeast Parallel Arcchitectures Center, Syracuse University, Syracuse, NY 13244
[2]Syracuse Research Corporation, Syracuse, NY 13244

A Parallel Approach for the Solution of Boundary Integral Equations

Dilip Krishnaswamy[1] (dilip@crhc.uiuc.edu), Ramesh Natarajan[2] (ramesh@watson.ibm.com) and Richard Lawrence[2]

A compute and transfer approach was used for the parallel solution of the boundary element method on the IBM SP-1 at the IBM T. J. Watson Research Center. The figure depicts the solution for the exterior Neumann problem on an ellipsoid. The data was distributed over processors in a 2-D block cyclic manner. Element integral values were generated in parallel and communicated to the appropriate processors using message aggregation. The highly-tuned dense matrix LU factorization and solve routines from SCALAPACK were used to solve for the value of the field at the nodal points on the triangulated surface. For a typical problem with 2050 nodal points (matrix size 2050 x 2050), an overall speedup of 10.49 was obtained on 16 processors on the IBM SP-1.

[1]University of Illinois at Urbana-Champaign, Urbana, IL61801
[2]IBM T. J. Watson Research Center, Yorktown Heights, NY10598