by a single computational function of the physical coordinates possible. Correspondingly, the scale range and dimension covered by the field function is limited only by machine word length. The same method can be used to represent time series with power-law frequency spectra in functional form, or to include time-dependence in random field problems.

COMPUTATION OF MAGNETIC COORDINATES AND ACTION-ANGLE VARIABLES. A. H. Reiman and N. Pomphrey, *Princeton University, Princeton, New Jersey, USA.*

We have developed a new algorithm for calculating magnetic surfaces and coordinates for a given three-dimensional magnetic field. The algorithm serves also to solve the equivalent problem of computing invariant tori and action-angle variables for a one-dimensional time-dependent numerically specified Hamiltonian (or a two-dimensional time-independent Hamiltonian). Our approach combines features of both iterative and trajectory following methods. This allows us to overcome the inefficiency of trajectory following methods near low order rational surfaces, while retaining some of the robustness of these methods.

FINITE-ELEMENT APPLICATIONS ON A SHARED-MEMORY MULTIPROCESSOR—ALGORITHMS AND EXPERIMENTAL RESULTS. Ramesh Natarajan, *IBM Thomas J. Watson Research Center, Yorktown Heights, New York, USA.*

We describe strategies for parallelizing finite element applications on a shared-memory multiprocessor. The applications studied include the convection-diffusion equation, and the Stokes equations of low Reynolds number hydrodynamics. The overall approach that we use is standard, but with significant restructuring for efficient parallel computation. The primary focus is on parallel methods for solving the linear systems of algebraic equations generated by the finite element discretization using polynomial iterative solvers preconditioned by incomplete factorizations. The challenging issue is the parallelization of the preconditioner, especially for the unstructured matrices obtained from finite element discretizations, and we describe the algorithms developed for this purpose. Specific experimental results obtained with our programs on ACE, a prototype 8-way, bus-based, shared-memory multiprocessor are discussed in detail.

NON-REFLECTING BOUNDARY CONDITIONS: A REVIEW. Dan Givoli, *Technion—Israel Institute of Technology, Haifa, ISRAEL*

Past and recent research on the use of non-reflecting boundary conditions in the numerical solution of wave problems is reviewed. Local and nonlocal boundary conditions are discussed, as well as special procedures which involve artificial boundaries. Various problems from different disciplines of applied mathematics and engineering are considered in a uniform manner. Future research directions are addressed.

NOTES TO APPEAR

ON COMPUTING ELECTROSTATIC FIELD LINES FOR TWO-DIMENSIONAL VACUUM FIELDS IN THE NEIGHBORHOOD OF LOCALIZED REGIONS OF CHARGE. E. J. Horowitz, *University of Maryland, College Park, Maryland, USA.*

STURM–LIOUVILLE SYSTEMS WITH POTENTIALS 0.5 cos $2nx$. Mei Kobayashi, *IBM Research Laboratory, Tokyo, JAPAN.*

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