JOURNAL OF COMPUTATIONAL PHYSICS 85, 502–504 (1989)

Abstracts of Papers to Appear in Future Issues

A METHOD FOR SOLVING THREE-DIMENSIONAL VISCOUS INCOMPRESSIBLE FLOWS OVER SLENDER BODIES. Moshe Rosenfeld, *NASA Ames Research Center, Moffett Field, California, USA*; Moshe Israeli and Micha Wolfshtein, *Technion, Haifa, ISRAEL.*

A marching iterative method for solving the three-dimensional incompressible and steady reduced Navier–Stokes equations in general orthogonal coordinate systems is described with the velocity and the pressure as dependent variables. The coupled set of the linearized finite-difference continuity and momentum equations are solved iteratively without any splitting or factorization errors. Each iteration consists of spatial marching from the upstream boundary to the downstream boundary. The discrete continuity and the two linearized crossflow momentum equations are satisfied at each marching step, even when the mainstream momentum equation is not converged. This solution procedure is equivalent to the solution of a single Poisson-like equation by the *successive plane over relaxation* method, while other available solution methods employ a Jacobi-type iterative scheme and therefore are less efficient. Several properties of the numerical method have been assessed through a series of tests performed on the laminar incompressible flow over prolate spheroids at intermediate incidence.

A PSEUDOSPECTRAL METHOD FOR TWO-POINT BOUNDARY VALUE PROBLEMS. S. J. Jacobs, *University of Michigan, Ann Arbor, Michigan, USA.*

Pseudospectral collocation is employed for the numerical solution of nonlinear two-point boundary value problems with separated end conditions. Second-order finite difference schemes are used as preconditioners for the spectral calculation, and a solution of the discretized equations is obtained using versions of the defect correction principle. The method and a variant based on an adaptive grid technique are tested on a variety of sample problems and are shown to provide high accuracy with low storage requirements.

FULL-WAVE CALCULATIONS IN FLUX COORDINATES FOR TOROIDAL GEOMETRY. B. A. Carreras, V. E. Lynch, E. F. Jaeger, D. B. Batchelor, and J. S. Tolliver, *Oak Ridge National Laboratory, Oak Ridge, Tennessee, USA.*

A two-dimensional (2D) full-wave code, HYPERION, employing a poloidal and toroidal mode expansion and including the toroidal terms arising in the wave equation, has been developed. It is based on the existing modules developed for the MHD stability codes. The plasma response is described by the collisionally broadened cold-plasma conductivity tensor. The code retains the $E_{\parallel}$ component of the electric field, which allows the study of the low-density region of the plasma. A detailed benchmarking of the HYPERION code has been done with the existing finite-difference full-wave code ORION.

SOLUTIONS OF REYNOLDS-AVERAGED NAVIER–STOKES EQUATIONS FOR THREE-DIMENSIONAL INCOMPRESSIBLE FLOWS. H. C. Chen, V. C. Patel, and S. Ju, *University of Iowa, Iowa City, Iowa, USA.*

A general numerical method for the solution of complete Reynolds-averaged Navier–Stokes equations for three-dimensional flows is described. The method uses nonorthogonal body-fitted coordinates,

0021-9991/89 $3.00