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Abstracts of Papers to Appear in Future Issues

ACCURACY ANALYSIS OF A BESSEL SPECTRAL FUNCTION METHOD FOR THE SOLUTION OF SCATTERING EQUATIONS. George H. Rawitscher, *University of Connecticut, Storrs, Connecticut, USA.*

A Bessel-function spectral method for obtaining the quantum-mechanical scattering wave functions, developed previously, was tested for the case that the potentials are complex Gaussian functions since, in this particular case, the required overlap integrals can be evaluated with great accuracy. The dependence of the elastic scattering S-matrix on the size of the space of the Bessel basis, on the choice of the sub-set of the basis functions, and on the choice of the matching radius was examined. The analysis is carried out to an accuracy of eight significant figures.

SOLUTION OF THE IMPLICITLY DISCRETIZED REACTING FLOW EQUATIONS BY OPERATOR-SPLITTING. R. I. Issa and A. D. Gosman, *Imperial College of Science & Technology, London, ENGLAND*; B. Ahmadi-Befrui, *AVL, Graz, AUSTRIA*; K. R. Beshay, *Cairo University, Cairo, EGYPT.*

The PISO method, which is a non-iterative method for the solution of the time-dependent, implicitly discretised fluid flow equations by operator-splitting, is extended here to handle reacting flows. The additional species conservation equations, together with the energy equation, are incorporated into the predictor-corrector sequence of steps. Both turbulent-mixing and chemical-kinetics controlled combustion models are catered for. The method is tested in one- and two-dimensional cases and a comparison with a comparable iterative scheme is made. The results show that such reacting flows can be handled by the new scheme with efficiency, while temporal accuracy is maintained.

A FRACTIONAL STEP SOLUTION METHOD FOR THE UNSTEADY INCOMPRESSIBLE NAVIER–STOKES EQUATIONS IN GENERALIZED COORDINATE SYSTEMS. Moshe Rosenfeld, *MCAT Institute, San Jose, California, USA*; Dochan Kwak, *NASA Ames Research Center, Moffett Field, California, USA*; Marxel Vinokur, *Sterling Software, Palo Alto, California, USA.*

A fractional step method is developed for solving the time-dependent three-dimensional incompressible Navier–Stokes equations in generalized coordinate systems. The primitive variable formulation uses the pressure, defined at the center of the computational cell, and the volume fluxes across the faces of the cells as the dependent variables, instead of the Cartesian components of the velocity. This choice is equivalent to using the contravariant velocity components in a staggered grid multiplied by the volume of the computational cell. The governing equations are discretized by finite volumes using a staggered mesh system. The solution of the continuity equation is decoupled from the momentum equations by a fractional step method which enforces mass conservation by solving a Poisson equation. This procedure, combined with the consistent approximations of the geometric quantities, is done to satisfy the discretized mass conservation equation to machine accuracy, as well as to gain the favorable convergence properties of the Poisson solver. The momentum equations are solved by an approximate factorization method, and a novel ZEBRA scheme with four-color ordering is devised for the efficient solution of the Poisson equation. Several two- and three-dimensional laminar test cases are computed and compared with other numerical and experimental results to validate the solution method. Good agreement is obtained in all cases.

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