Abstract Submitted
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Application of Vorticity Confinement to Turbulence NICHOLAS LYNN, JOHN STEINHOFF, University of Tennessee Space Institute — The Vorticity Confinement (VC) technique will be described that can accurately and efficiently compute high Reynolds number turbulence. Physically these flows are dominated by thin vortices that can be convected long distances without significant dissipation; VC treats these features as modeled solitary waves directly represented on the computational grid. Another feature of VC is that it contains an immersed boundary model, which allows the simple treatment of complex bodies. The VC method then models the boundary layer, which may separate, over 2-3 grid cells near the surface. VC will be contrasted with conventional Eulerian computational methods. It will be explained how VC, particularly for flows containing treating thin, convecting vortices, eliminates the deficiencies of the conventional methods. Following the description of the model, a sequence of turbulent VC results is presented. First presented is turbulent flow over a cylinder. The cylinder is immersed in a uniform Cartesian grid. Results will be compared against experiments showing the ability of VC to compute the resulting wake despite utilizing a coarse grid. Also present will be a study on the Taylor-Green vortex.

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