de Zeeuw, Darren; **Powell, Kenneth G.**

An adaptively refined Cartesian mesh solver for the Euler equations. (English)

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J. Comput. Phys. 104, No. 1, 56-68 (1993).

Summary: A method for adaptive refinement of a Cartesian mesh for the solution of the steady Euler equations is presented. The algorithm creates an initial uniform mesh and cuts the body out of that mesh. The mesh is then refined based on body curvature. Next, the solution is converged to a steady state using a linear reconstruction and Roe's approximate Riemann solver. Solution-adaptive refinement of the mesh is then applied to resolve high- gradient regions of the flow. The numerical results presented show the flexibility of this approach and the accuracy attainable by solution- based refinement.

MSC:

76M20	Finite difference methods applied to problems in fluid mechanics
76N10	Existence, uniqueness, and regularity theory for compressible fluids and gas dynamics
65N50	Mesh generation, refinement, and adaptive methods for boundary value problems involving PDEs

Keywords:

initial uniform mesh; body curvature; linear reconstruction; Roe's approximate Riemann solver

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