

**Minion, Michael L.**

**A projection method for locally refined grids.** (English) Zbl 0859.76047  
J. Comput. Phys. 127, No. 1, 158-178 (1996).

A numerical method for the solution of the two-dimensional Euler equations for incompressible flow on locally refined grids is presented. The method is a modified second-order Godunov-projection method. Second-order accuracy of the numerical method in time and space is established through numerical experiments. A discussion of the adjointness relation between gradient and divergence operators for a refined grid MAC projection is presented, and a refined grid approximate projection is developed. An efficient multigrid method which exactly solves the projection is developed, and a method for casting certain approximate projections as MAC projections on refined grids is presented.

**MSC:**

- [76M20](#) Finite difference methods applied to problems in fluid mechanics
- [76B47](#) Vortex flows for incompressible inviscid fluids
- [65M50](#) Mesh generation, refinement, and adaptive methods for the numerical solution of initial value and initial-boundary value problems involving PDEs

Cited in **50** Documents

**Keywords:**

gradient operator; divergence operator; two-dimensional Euler equations; second-order Godunov-projection method; refined grid MAC projection; multigrid method

**Full Text:** [DOI](#)