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Analysis of a stabilized finite volume element method based on multiscale enrichment for the Stokes equation. (Chinese. English summary) Zbl 07404453

Summary: In this paper, we present a new stabilized finite volume element method for the Stokes equation. This method is based on the multiscale enrichment and uses the lowest finite element pairs $P_1/P_0$. The stability and convergence of the optimal order in $H^1$-norm for velocity and $L^2$-norm for pressure are obtained. Using the dual problem for the Stokes equation, we establish the convergence of the optimal order in $L^2$-norm for the velocity.

MSC:

65M08 Finite volume methods for initial value and initial-boundary value problems involving PDEs
65M60 Finite element, Rayleigh-Ritz and Galerkin methods for initial value and initial-boundary value problems involving PDEs
65M12 Stability and convergence of numerical methods for initial value and initial-boundary value problems involving PDEs

Keywords:
finite volume element method; $P_1/P_0$ finite elements; multiscale enrichment; Stokes equation