Mathematics > Numerical Analysis

Optimal error bounds for two-grid schemes applied to the Navier-Stokes equations

Javier de Frutos, Bosco García-Archilla, Julia Novo

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We consider two-grid mixed-finite element schemes for the spatial discretization of the incompressible Navier-Stokes equations. A standard mixed-finite element method is applied over the coarse grid to approximate the nonlinear Navier-Stokes equations while a linear evolutionary problem is solved over the fine grid. The previously computed Galerkin approximation to the velocity is used to linearize the convective term. For the analysis we take into account the lack of regularity of the solutions of the Navier-Stokes equations at the initial time in the absence of nonlocal compatibility conditions of the data. Optimal error bounds are obtained.

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