DISCONTINUOUS GALERKIN METHOD FOR THE STOKES EQUATIONS WITH MIXED BOUNDARY CONDITIONS

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ABSTRACT. We propose and analyze a discontinuous Galerkin approximation for the incompressible Stokes problem in two dimension spaces. We suppose that the boundary is devided into three open and disjoint subsets Γ_1, Γ_2 and Γ_3. The boundary conditions are mixed with the vorticity condition: $\operatorname{curl} \boldsymbol{u} = w_0$ and $\boldsymbol{u} \cdot \boldsymbol{n} = \boldsymbol{b} \cdot \boldsymbol{n} =$ on the first part of the boundary Γ_1, a pressure condition: $p = p_0$ and $\boldsymbol{u} \cdot \boldsymbol{t} = \boldsymbol{a}.\boldsymbol{t}$ on Γ_2 and a Dirichlet boundary condition $\boldsymbol{u} = \boldsymbol{u}_0$ on Γ_3. We establish a priori error estimates in the energy norms and we present an a posteriori error estimator of residual type.

Keywords: Discontinuous Galerkin method , Stokes equations, a priori error, a posteriori error

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