

AN ADAPTIVE DISCONTINUOUS GALERKIN METHOD FOR A STOKES/BIOT FLUID-POROELASTIC STRUCTURE INTERACTION MODEL

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Abstract

The paper presents an a posteriori error estimator for a (piecewise linear) nonconforming finite element approximation of the problem defining the interaction between a free fluid and poroelastic structure. The free fluid is governed by the Stokes equations, while the flow in the poroelastic medium is modeled using the Biot poroelasticity system. Equilibrium and kinematic conditions are imposed on the interface. The approach utilizes the same nonconforming Crouzeix-Raviart element discretization on the entire domain [Houédanou Koffi Wilfrid, Results in Applied Mathematics 7 (2020) 100127, Elsevier]. For this discretization, we derive a residual indicator based on the jumps of normal derivative of the nonconforming approximation. Lower and upper bounds form the main results with minimal assumptions on the mesh.

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