

STABILIZED HYBRID FINITE ELEMENT FORMULATIONS FOR COUPLED FLOW PROBLEMS

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ABSTRACT. A stabilized hybrid mixed finite element formulation for naturally coupling Stokes and Darcy's flows in porous media is proposed in [1] in which the Lagrange multipliers are identified with the trace of the velocity field on the interface of the elements. The same finite element approximation spaces are adopted for velocity, pressure and the Lagrange multipliers in both Stokes and Darcy's domains. In this work we extend this stabilized hybrid finite element formulation to solve coupled time harmonic acoustic-porous-structure problems modeled by the Helmholtz equation in the acoustic domain and the time-harmonic elastic wave equation in the porous domain [2, 3]. Results of some numerical experiments illustrate the flexibility and the robustness of the proposed formulation.

Keywords: mixed methods, hybrid methods, stabilization, coupled flows, Helmholtz problem

Mathematics Subject Classifications (2010): 65N30, 35K05.

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