

VIRTUAL ELEMENT APPROXIMATIONS FOR THE POROELASTICITY/ELASTICITY INTERFACE PROBLEM ON POLYGONAL MESHES

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ABSTRACT. In this talk, we propose, analyse and implement a virtual element discretisation for an interfacial poroelasticity/elasticity consolidation problem. The formulation of the time-dependent poroelasticity equations uses displacement, fluid pressure and total pressure, and the elasticity equations are written in displacement-pressure formulation. The construction of the virtual element scheme does not require Lagrange multipliers to impose the transmission conditions (continuity of displacement and total traction, and no-flux for the fluid) on the interface. We show the stability and convergence of the virtual element method for different polynomial degrees, and the error bounds are robust with respect to delicate model parameters (such as Lamé constants, permeability, and storativity coefficient). Finally we provide numerical examples that illustrate the properties of the scheme.

Keywords: Biot equations and virtual element methods and time-dependent problems and a priori error analysis.

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