

Department of Mathematics

University of Houston

Scientific Computing Seminar

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Stokes-Biot modeling of fluid-poroelastic structure interaction

Thursday, Sept. 20, 2018

1:30 PM- 2:30 PM

Room 646 PGH

Abstract:

We study mathematical models and their finite element approximations for solving the coupled problem arising in the interaction between a free fluid and a fluid in a poroelastic material. Applications of interest include flows in fractured poroelastic media and arterial flows. The free fluid flow is governed by the Navier-Stokes or Stokes/Brinkman equations, while the poroelastic material is modeled using the Biot system of poroelasticity. We present several approaches to impose the continuity of normal flux, including an interior penalty method and a Lagrange multiplier method. A dimensionally reduced fracture model based on averaging the equations over the cross-sections will also be presented. Stability, accuracy, and robustness of the methods will be discussed.