

Title: Stochastic Finite Element Methods for Poroelasticity

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Abstract: Recent concerns over the safety of oil and natural gas 'fracking' have driven the need to develop methods for uncertainty quantification for coupled subsurface flow & deformation processes. Traditional monte-carlo methods are versatile, but exhibit prohibitively slow convergence. In this work, we present two polynomial chaos expansion methods specifically for Biot's Poroelasticity Equations based on stochastic versions of galerkin and collocation methods. We address the advantages and disadvantages of each approach.