

EFFICIENT AND ROBUST TECHNIQUES FOR THE NUMERICAL SIMULATION OF POROMECHANICS

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ABSTRACT

In this section we are considering flow in deformable porous media, also called poromechanics. There are plenty relevant applications of poromechanics, e.g. CO₂ storage, enhanced geothermal energy extraction or soil pollution, to name a few. The mathematical models behind are based on different variants of Biot's model (quasi-static, nonlinear, dynamic, multiphase flow...), consisting on coupled partial, possibly degenerate, differential equations which are very difficult to be solved. Here, we will focus on efficient solvers for poromechanics. This will include splitting schemes, discretization methods, parallel algorithms and algebraic solvers. Important aspects like convergence, optimization and stabilization of the schemes will be discussed.