

EFFICIENT SOLVERS FOR COUPLED FLOW AND DEFORMATION IN POROUS MEDIA

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ABSTRACT

Fluid flow and deformation in porous media have critical applications across various fields, including cancer research, CO₂ sequestration, enhanced geothermal energy extraction, and soil pollution remediation. The quasi-static, linear Biot model serves as the foundational mathematical framework for studying these processes. Despite substantial interest and research over the past decade, the development of efficient numerical methods for the Biot model and its extensions remains a significant challenge.

This session will explore recent advancements in numerical schemes for modeling flow and deformation in porous media, with a particular emphasis on nonlinear, dynamic, and multidimensional Biot models. The session will address key topics such as discretization techniques, linearization strategies, stabilization methods, and operator splitting approaches, offering a comprehensive discussion on overcoming current computational challenges.