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ADVANCED SOLVERS FOR LINEAR OR NON-LINEAR POROMECHANICS

FLORIN A. RADU[*], PAOLO ZUNINO[†]

[*] University of Bergen, Norway
Allegaten 41, 5020, Bergen, Norway
florin.radu@uib.no

[†] Politecnico di Milano, Milano, Italy
Piazza Leonardo da Vinci 32, 20133, Milano, Italy
paolo.zunino@polimi.it

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ABSTRACT

Poromechanics, i.e. the coupling of flow and mechanics in a porous medium plays an important role in many socially relevant applications. These include CO_2 sequestration, geothermal energy extraction, erosion of sedimentary basins or biomedical problems. Typically, the Biot model [1], which consists of two coupled partial differential equations is used for modelling poromechanics but new models have also recently appeared, see e.g. [2,3]. Setting up accurate and efficient computational solvers for poromechanics is still a challenge for the scientific community interested in realistic applications.

In this session we will address advanced numerical solvers for poromechanics. Monolithic and splitting schemes will be considered, acceleration, preconditioning and stability issues will be discussed, see e.g. [4]. Solvers for linear or non-linear extensions of the Biot model to include e.g. large deformations [5], multiphase flow [6] or free boundary problems [7] are targeted as well. Pioneering studies exploring the combination of classical numerical solvers with machine learning techniques to accelerate the solutions of these problems are also welcome, provided that they are specifically developed for poromechanics equations.

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