6th European Conference on Computational Mechanics (Solids, Structures and Coupled Problems) (ECCM 6)
7th European Conference on Computational Fluid Dynamics (ECFD 7)
June 11- 15, 2018, Glasgow, UK

RECENT ADVANCES IN SIMULATION OF FLOW IN DEFORMABLE POROUS MEDIA

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Key words: Porous media, fluid flow, poromechanics, approximation schemes, solvers.

ABSTRACT

The numerical simulation of coupled fluid flow and mechanical deformation in porous media has become of increasing importance in several branches of technology and natural sciences including power engineering, environmental and petroleum engineering, vibroacoustics, biomechanics and medicine. The numerical analysis and approximation of the mathematical models describing the fluid-structure interaction are subject to various complexities due to the coupling conditions and the multiscale properties of involved structures; cf. [1–3].

In this minisymposium recent trends and progress in the development, analysis and application of robust and efficient discretization methods and solver techniques for flow in deformable porous media are presented. All types of Galerkin methods for the discretization of the spatial variables, variational and multirate time discretizations as well as splitting and monolithic solver technologies along with efficient preconditioning techniques are in the scope of interest. Beyond the quasi-static Biot system more complex models including fully dynamic equations, viscoelastic constitutive response and multiphase flow are considered.

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