Numerical methods for nonlinear and coupled processes (flow, reactive transport and deformation) in porous media

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Short Description

Porous media processes like flow, reactive transport and deformation appear in numerous applications of societal and technological relevance. For a thorough understanding of such processes, mathematical modelling and numerical simulation are key technologies. Typically, the mathematical models are expressed in terms of coupled systems of nonlinear, possibly degenerate equations, which makes the development of efficient numerical algorithms a challenging task.

This minisymposium will address issues related to the numerical approximation of mathematical models for porous media processes. The focus will be on the development of efficient schemes and their convergence analysis, along with relevant applications. The presentations will discuss convergence towards the weak solution, a priori error estimates, a posteriori error control, the convergence of iterative schemes for solving nonlinear equations and coupling different model components. Efficient discretisation methods like higher order finite volumes, discontinuous Galerkin, or polytopal discretizations, as well as adaptive multiscale schemes and domain decomposition methods will be addressed.