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On a workflow for efficient computation of the permeability of tight sandstones

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We present a workflow for fast pore-scale simulation of single-phase flow in tight reservoirs typically characterized by low, multiscale porosity. Multiscale porosity implies that the computational domain contains porous voxels (unresolved porosity) in addition to pure fluid voxels. In this case, the Stokes-Brinkman equations govern the flow, with the Darcy term needed to account for the flow in the porous voxels. As the central part of our workflow, robust and efficient solvers for Stokes and Stokes-Brinkman equations are presented. The solvers are customized for low-porosity binary and multiclass images, respectively. Another essential component of the workflow is a preprocessing module for classifying images with respect to the connectivity of the multiscale pore space.
Particularly, an approximation of the Stokes-Brinkman problem, namely, the Darcy problem, is investigated for the images that do not have pure fluid percolation paths. Thorough computational experiments demonstrate efficiency and robustness of the workflow for simulations on images from tight reservoirs.

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Time Block Preference

Time Block A (09:00-12:00 CET)

Participation

In person

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