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Domain decomposition with Robin interface conditions for reservoir simulation

A multiscale method for the porous-media flow equations is proposed. It is based on a domain-decomposition procedure in which the subdomains are coupled by Robin boundary conditions. There appear two independent spaces on the skeleton of the decomposition, corresponding to interface pressures and fluxes, that can be chosen with great flexibility to accommodate local features of the permeability field. Experiments will be presented comparing the proposed method to existing ones in the simulation of realistic flow in high-contrast channelized porous formations.

Joint work with Rafael T. Guiraldello, Fabrício S. Sousa, and Roberto F. Ausas (ICMC, University of São Paulo, Brazil), and Felipe Pereira (The University of Texas at Dallas, USA).