

## Nonstationary Flow of Stokesian Fluid through Elastic Skeleton with Hierarchical Structure

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The aim of this contribution is to study the problem of nonstationary flow of Stokesian fluid through linear elastic porous skeleton. The novelty of the paper consists in that the skeleton is deformable and possesses a hierarchical structure. For simplicity, it is assumed that the porous matrix is characterized by two well-separated scales, namely  $\varepsilon$  and  $\varepsilon^2$ , where  $\varepsilon$  is a small parameter characteristic for the double-periodic microstructure. Two well-separated scales are typical for fractured reservoirs. The homogenization method is based on multi-scale convergence, in this case three-scale convergence. Passing with  $\varepsilon$  to zero in the sense of this convergence we get the macroscopic relationships, included the generalized Darcy law. The last involves both scales and is nonlocal in time.

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