A kinetic approach to the flow of an incompressible fluid over a porous matrix

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ABSTRACT

The macroscopic behavior of a Poiseuille-Couette flow in a channel and of the flow through an adjacent porous medium is studied by means of the molecular kinetics based on the Boltzmann equation. The boundary conditions at the interface between the two domains are investigated via a matching procedure. Two different scalings are followed which lead to two different forms of the equations which govern the flow through the fully saturated matrix.