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Effective viscosity in Brinkman equation and stress condition at the interface between a porous medium and a pure fluid HOWARD HU, University of Pennsylvania — We examine the flow parallel to the interface between a porous medium and a pure fluid. When Darcys law is used to describe the momentum transport in the porous layer, the classic Beavers-Joseph condition relates the shear rate and the slip velocity at the interface with a slip parameter that depends on the structure of the porous surface. When the Brinkman equation is used, the averaged velocity is continuous at the interface, however the fluid shear stress across the interface commonly experiences a jump. This shear stress jump can be expressed in terms of the slip velocity at the interface divided by a length characterized by the square root of the permeability, a dimensionless stress jump coefficient, and the effective viscosity introduced in the Brinkman equation. In this work, we explore methods to compute numerically the values of effective viscosity for given porous structures, and study the momentum transfer from the clear fluid onto the solid structure at the interface.

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