

# A model for boundary permeation

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A model for the motion of fluid through a permeable boundary, based on a dynamic boundary condition, will be discussed. The boundary condition describes the dynamics of the permeation in terms of an assumption of ‘pseudo-shear flow’ at the boundary. For Navier-Stokes fluids and fluids of grade two, the ensuing system of equations is conditionally stable. *I.e.* given that the initial energy is small, the motion will (in the absence of body forces) dissipate to the rest state. In the case of a Navier-Stokes fluid, the decay is polynomial and for second grade fluids the decay is exponential. For second grade fluids, the existence of a solution can be proved, but this is an open problem for Navier-Stokes fluids.