Transition flow rate in viscous withdrawal. FRANCOIS
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Chicago — We present the results of a numerical study of viscous selective with-
drawal. In this system, two immiscible layers of different viscosities are laid in a
container. A straw through which fluid is withdrawn is then introduced in the up-
per fluid. Above a certain transition flow rate, Q, the lower layer also becomes
entrained. We determine numerically the dependence of Q on the straw height and
viscosity ratio. The transition flow rate corresponds to the point where viscous en-
trainment from the upper fluid overcomes the resistance of surface tension. Knowing
the lengthscales relevant to the flow and interface shape, one can estimate the tran-
sition flow rate. Our results were favorably compared with previously published
experimental data.

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