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Large scale simulations of forced dewetting SHAHRIAR AFKHAMI, New Jersey Institute of Technology, STEPHANE ZALESKI, Sorbonne Universites, UPMC Univ Paris 06, CNRS, UMR 7190, France — We report on the numerical simulations of moving contact lines, in a Volume-Of-Fluid context, for the forced dewetting problem. In our study, we use the Gerris flow solver and quantify the amount of numerical slip in the numerical method. Using the asymptotic hydrodynamic theory of the vicinity of the contact line and matching it to the static theory of menisci, we derive a theory for the effect of the mesh size and the imposed contact angle at that scale on the large scale regions of the simulation. The numerical slip along with an adaptation of the contact angle, which involves a numerical scaling factor, lead to an implicit dynamic contact angle model in our simple numerical method already used for static contact angles. We show that the scaling factor in our theory is related to a microscopic length scale that involves unknown coefficients which appear in the higher order terms in the asymptotic matching; we deduce the coefficients by direct comparison of the resolved numerical simulations with Cox's asymptotic theory. We show that our numerical procedure can be thought of as a subgrid model, that is imposing a dynamic contact angle consistent with the contact line velocity predicted by the asymptotic analysis.

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