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Influence of spatial variation of phenomenological parameters on the modeling of boundary conditions for flows with dynamic wetting YUKA HIZUMI, TAKESHI OMORI, YASUTAKA YAMAGUCHI, TAKEO KAJISIMA, Department of Mechanical Engineering, Osaka University — For reliable prediction of multiphase flows in micro- and nano-scales, continuum models are expected to account for small scale physics near the contact line (CL) region. Some existing works (for example the series of papers by the group of Qian and Ren) have been successful in deriving continuum models and corresponding boundary conditions which reproduce well the molecular dynamics (MD) simulation results. Their studies, however, did not fully address the issue of adsorption layer especially in the CL region, and it is still not clear if general conclusion can be deduced from their results. In the present study we investigate in detail the local viscosity and the corresponding stress tensor formulation in the solid-liquid interface and in the CL region of immiscible two-phase Couette flows by means of MD simulation. The application limit of the generalized Navier boundary condition and the continuum model with uniform viscosity is addressed by systematic coarse-graining of sampling bins.

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