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Apparent and Actual Dynamic Contact Angles in Confined Two-Phase Flows[1] TAKESHI OMORI, TAKEO KAJISHIMA, Osaka Univ — To accurately predict the fluid flow with moving contact lines, it has a crucial importance to use a model for the dynamic contact angle which gives contact angles on the length scale corresponding to the spacial resolution of the fluid solver. The angle which a moving fluid interface forms to a solid surface deviates from an actual (microscopic) dynamic contact angle depending on the distance from the contact line and should be called an apparent (macroscopic) dynamic contact angle. They were, however, often undistinguished especially in the experimental works, on which a number of empirical correlations between a contact angle and a contact line velocity have been proposed. The present study is the first attempt to measure both apparent and actual contact angles from the identical data sets to discuss the difference and the relationship between these two contact angles of difference length scales. The study is conducted by means of numerical simulation, solving the Navier-Stokes equation and the Cahn-Hilliard equation under the generalized Navier boundary condition for the immiscible two-phase flow in channels. The present study also illustrates how the system size and the physical properties of the adjoining fluid affect the apparent and the actual dynamic contact angles.

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