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Numerical study on deformation and coalescence of droplets in a two-dimensional channel flow¹ SUNGROK JUNG, MYOUNGHWAN CHO, Seoul National University, HYOUNGGWON CHOI, Seoul National University of Science and Technology, JUNGYUL YOO, Seoul National University — An improved level-set (LS) method is implemented to simulate the two-phase incompressible flow in two-dimensional channel considering the effect of interfacial tension. A mixed element is adopted, so that the Navier-Stokes equations are solved by using the q2q1 integrated finite element method (FEM), and the LS function is solved by using the q1q1 element. Direct approach method using geometric information is implemented instead of the conventional hyperbolic-type partial differential equation for reinitializing the LS function. The present code is verified by comparing the droplet movement and merging process with existing studies. It is shown that the computational results for deformation and migration of the droplets are in good agreement with those of the previous studies. In addition, the droplet merging process in straight and diverging channels is studied by using the present method. Comparing with the experimental data, the results of the present study shows similar tendencies for respective cases.

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