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Modeling of Two-Phase Immiscible Flow with Moving Contact Lines MOATAZ ABU ALSAUD, CYPRIEN SOULAINE, Stanford University, AMIR RIAZ, University of Maryland, College Park, HAMDI TCHELEPI, Stanford University, STANFORD UNIVERSITY COLLABORATION, UNIVERSITY OF MARYLAND, COLLEGE PARK COLLABORATION — A new numerical method based on the implicit interface approach on Cartesian grids is proposed for modeling two-phase immiscible flow with moving contact lines. The reinitialization of level-set function by computing the minimum distance to linearly reconstructed interface to obtain signed distance function is extended to include the contact angle boundary condition. The physics of contact line dynamics is implemented using the Cox-Voinov hydrodynamic theory that efficiently captures the effect of the microscopic contact line region. The numerical method is validated through various examples. Parasitic currents are studied in the case of static and constantly advected parabolic interface intersecting the domain boundary with an imposed contact angle. Moving contact line in the viscous dominated regime is studied and verified through comparison with experiments.

Moataz Abu AlSaud
Stanford University

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