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Yuan Gao* (yg86@duke.edu). *Gradient flow formulation and numerical simulation for motion by mean curvature and contact line dynamics on rough surface.*

We study the dynamics and equilibrium of a droplet placing on an inclined rough surface. The capillary effect, which contributes the leading behaviors of the geometric motion of the droplet, is characterized by the surface tension on interfaces and greatly affects the dynamics of the contact angle and the contact line, where three phases (gas, liquid and solid) meet. Based on explicit moving boundaries and semi-Lagrangian method, we propose unconditionally stable first/second order numeric schemes to simulate the geometric motion of the droplet described using motion by mean curvature with moving contact lines. Challenging examples are demonstrated and the accuracy and long-time validation is compared with quasi-static solution obtained by desingularized differential-algebraic system of equations. (Received January 27, 2020)