

Optimal control of sliding droplets using the contact angle

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We present results on optimal control of sliding droplets. Here the contact angle between droplet and solid serves as a control variable. The fluid is modeled by a thermodynamically consistent diffuse interface model with a suitable contact line model.

In earlier work [H. Bonart, C. Kahle, J.-U. Repke, JCP 399 (2019)] we compared different time discretization schemes for this model that mimics the energy behaviour of the continuous model. We now employ a particular scheme to derive existence of optimal controls for a time discrete optimal control problem and also first order necessary conditions.

As controls we consider finite dimensional controls for the contact angle distribution.

We test our approach by driving a droplet up an inclined plate.