



Beitrag ID: 1

Typ: Talk

Efficient simulation of wetting dynamics on elastic substrates

Montag, 8. November 2021 11:00 (20 Minuten)

The interaction of a viscoelastic substrate with liquid droplets is at small length scales dominated by surface tension forces. Understanding how these forces deform the solid is crucial for the design of new materials, structures, and fabrication techniques.

We present a numerical model to simulate the interaction between two immiscible fluids and an incompressible viscoelastic solid. The fluid-fluid interface is represented by a phase-field function. The deforming elastic body is described by an additional phase-field [1] or a moving Finite-element grid [2]. Formulating all equations in an Eulerian frame of reference, we obtain a single momentum equation including the solid and both fluid materials.

In numerical tests we demonstrate that this novel method is robust and flexible, and we discuss the advantages and disadvantages of both models ([1] vs. [2]).

[1] Aland, S., Auerbach, P. (2021). A ternary phase-field model for wetting of soft elastic structures. *Int. J. Numer. Meth. Engrg.*, 1–15. <https://doi.org/10.1002/nme.6694>

[2] Aland, S., Mokbel, D. (2021), A unified numerical model for wetting of soft substrates, *International Journal for Numerical Methods in Engineering*, 122,4,903-918, <https://doi.org/10.1002/nme.6567>

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Sitzung Einordnung: Short talks