Numerical Simulation of a Droplet Bouncing on a Soap Film

JEAN-CHRISTOPHE NAVE, MIT - Department of Mathematics — We present a numerical method to simulate the interaction of a droplet with a soap film. Our numerical method uses two level set functions to track respectively the droplet and the soap film. The Navier-Stokes equations are solved in 3D using finite differences and a projection method. The proper jump and boundary conditions are enforced in a sharp (sub-grid) manner to maintain accuracy in the zone where both interfaces are close. We validated our approach by reproducing experiments performed by Gilet and Bush at MIT. We will show the ability of the method to reproduce bouncing, break-through, and partial break-through and conclude with some future applications.

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