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# Fluidic two-phase biomembranes: Numerical analysis and computations

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## Abstract

A parametric finite element approximation of a fluidic membrane, whose evolution is governed by a surface Navier–Stokes equation coupled to bulk Navier–Stokes equations, is presented. The elastic properties of the membrane are modelled with the help of curvature energies of Willmore and Helfrich type. We allow for two different phases to be present on the membrane, with their own elastic properties, giving rise to an additional line energy. This is modelled with the help of a phase field that evolves according to a surface Cahn–Hilliard equation.

In this talk we investigate some desirable properties of the scheme, including stability and good mesh properties, and present several numerical simulations.

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