Linearization and local existence of solutions for the volume preserving mean curvature flow with line tension

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In this talk we consider an evolving hypersurface Γ with boundary contact to some fixed container Ω enclosing a volume V and spreading over an area $D \subset \partial\Omega$. We deal with the energy functional

$$E(\Gamma) := \int_\Gamma 1 d\mathcal{H}^2 - a \int_D 1 d\mathcal{H}^2 + b \int_{\partial\Gamma} 1 d\mathcal{H}^1 + \lambda \left(\int_V 1 dx - V_0 \right)$$

for $a, b, V_0 \in \mathbb{R}$ with $b \geq 0$. From its first variation we deduce the necessary conditions for a minimizer of that energy and a flow that tends towards such a minimizer. After rewriting the flow as a second order PDE with second order boundary conditions over a fixed reference hypersurface we linearize the flow and the aim is to show short-time existance of solutions for this PDE. Moreover, the main problem will be addressed - namely the nonlocality of the linearized flow. A short discussion about strategies to solve this problem will end the talk.