Abstract Submitted
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Effects of nonlinear membrane elasticity on capsule recovery[1] ANDRES GONZALEZ-MANCERA, CHARLES EGGLETON, UMBC — The recovery of a capsule from an initially deformed shape is considered. The problem is solved numerically for a capsule made of an incompressible liquid surrounded by a thin elastic membrane using the Boundary Integral Method. Elastic membranes with different constitutive models providing a wide range of behaviors at large deformations (strain-hardening, strain- softening and linear elastic) were considered. The results suggest that the recovery process is dominated by the isotropic dilatation modulus. The recovery process from small deformations was seen to be nearly independent of the membrane constitutive model. Recovery from large deformations was highly dependent on the constitutive model and the initial geometry of the capsule. Analysis of the recovery from large deformations demonstrated that the process is modulated by the tangential component of the elastic traction, \F$_t$, acting on the membrane. This component of the traction was seen to either favor or oppose the recovery depending on the constitutive equation used to model the elastic membrane. The differences in the recovery process can be used to identify the best model for a particular capsule based on features observed during the recovery process.

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