Abstract Submitted
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A novel computational method to determine the dynamics of a lipid bilayer vesicle in a viscous flow[1] DAVID SALAC, MICHAEL MIKSIS, Northwestern University — Models of lipid bilayer vesicle motion require that both the local area element of the interface and the volume enclosed by the interface be conserved. Here we present a novel level-set computational method to predict the dynamics of a vesicle under the influence of an external viscous fluid. The fluid both inside and outside the vesicle is governed by the Navier-Stokes equations. We impose both the volume and area constraint by implementing a novel splitting scheme. Similar to standard pressure-correction methods for the Navier-Stokes equations, which require the velocity field to be divergence free, we solve a variable coefficient pressure-Poisson equation with Neumann boundary conditions to ensure volume conservation. We also impose the constraint that the velocity field must be divergence free on the moving interface. This necessitates the solution of an additional partial differential equation. This equation and the needed boundary conditions will be presented. Numerical examples of the scheme and convergence checks will also be presented.

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