Abstract Submitted
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Improvements to Level Set, Immersed Boundary methods for Interface Tracking[1] CHRIS VOGL, RANDY LEVEQUE, University of Washington — It is not uncommon to find oneself solving a moving boundary problem under flow in the context of some application. Of particular interest is when the moving boundary exerts a curvature-dependent force on the liquid. Such a force arises when observing a boundary that is resistant to bending or has surface tension. Numerically speaking, stable numerical computation of the curvature can be difficult as it is often described in terms of high-order derivatives of either marker particle positions or of a level set function. To address this issue, the level set method is modified to track not only the position of the boundary, but the curvature as well. The definition of the signed-distance function that is used to modify the level set method is also used to develop an interpolation-free, closest-point method. These improvements are used to simulate a bending-resistant, inextensible boundary under shear flow to highlight area and volume conservation, as well as stable curvature calculation.

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