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Isogeometric analysis of drop deformation in isoviscous shear flow
AMIN AHMADI JONEIDI, CLEMENS VERHOOSEL, PATRICK ANDERSON, Eindhoven university of technology — We use the Boundary Integral Method (BIM) to study the deformation of a drop in iso-viscous shear flow. Traditionally the drop surface is represented by a linear triangular mesh. The novelty of this work compared to prior studies is applying Isogeometric Analysis (IGA) to define the drop interface. In this method splines are used as smooth shape functions to create the surface instead of the traditional non-smooth triangular surface. This makes IGA applicable in the case when the physics at the interface becomes more complicated, for example if the deformation of a red blood cell or a vesicle is investigated; these involve higher-order surface gradients in the force jump across the interface. For the iso-viscous drop it is observed that the drop deforms and deviates from the initial spherical shape and orients itself in the fixed direction. Different values of the capillary number -which is the measure of the ratio between viscous and surface tension forces- have been studied and the results match very well with traditional BIM. IGA results for more complex interfacial force jumps are discussed.

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