DNS of rising bubbles in a vertical homogeneous shear flow
SADEGH DABIRI, University of Notre Dame — The bubbly flow occurs in many natural and industrial situations such as boilers and bubble column reactors. In many of these flows, bubbles rise inside a shear layer. Interaction between bubbles and the shear creates a lateral lift force on the bubbles and affects their distribution in the domain which in turn will affect the drag force on the flow and the flow rate. Here, the rising motion of buoyant bubbles in a homogeneous shear flow in vertical direction is studied. In order to create a homogeneous shear flow, periodic boundary condition in all three directions is implemented. A finite difference method with front tracking is developed that satisfies the periodic-shear boundary condition. The effect of the deformability of bubbles on the magnitude and direction of the lateral lift force is discussed.

Sadegh Dabiri
University of Notre Dame

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