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Reversed trajectories of interacting pair of drops in a steady shear at finite inertia KAUSIK SARKAR, PETER OLAPADE, RAJESH SINGH, University of Delaware — Interactions between viscous drops in a steady shear are numerically simulated using front tracking finite difference method. The results match well at low Reynolds number with the experimental observations of Guido and Simione (1998). At finite inertia, the drops behave differently from that in Stokes flow. Two drops placed initially flow-direction and shear-direction offsets do not pass each other. Instead, the drops upon interaction reverse their trajectories. Such behaviors were already reported for freely rotating solid particles, where it is ascribed to the reversed streamlines around a particle at finite inertia. However, drop deformation critically affects the trajectories, in that for some values of Reynolds numbers, drops pass each other at low and high capillary numbers, but reverse their motion at intermediate capillary numbers. The results are due to the increased drop inclination in the flow direction at increased capillary number.

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