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Interfacial interactions in the wake of elliptic cylinders

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The interfacial interaction between two fluids has always been an interesting field to investigate, for the discontinuity treatment and the tracking of the interface between two fluids, a lot of methods have emerged. We have developed a code for Level-Set Method with Immersed Boundary Method using one-fluid approach. We validate the code for level set for Rayleigh-Taylor instability and Rising bubble problem. We investigate the influence of the interface on the flow structures in the wake of a solid body. Flow over rigid bodies with wall effects has been studied but the interesting part comes when there is interface is in the vicinity of the body. The energy transfer between two different fluids with different properties causes waves on the interface which tightly binds fluids. The rigid elliptic cylinder is located in one of the fluids and is very near to the interface and we investigate forces and effects of the other fluid for incoming velocity profiles and different orientation and movements of the elliptic cylinder in 2-d. We also look at the interaction of multiple elliptic cylinders with the interface and we investigate the forces on the bodies as well.

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