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Darwinian drift: Effects of Wake Vortices and Multiple Obstacles SERGEI MELKOUMIAN, BARTOSZ PROTAS, McMaster University — When a body passes through an unbounded fluid, it induces a net displacement of fluid particles. The difference between the initial and final positions of a fluid particle is defined as the Darwinian drift and plays an important role in the characterization of the stirring occurring in multiphase flows and in the context of biogenic mixing. Traditional studies of drift have mainly focused on single obstacles moving in a potential flow. In the present investigation we consider the effect of wake vorticity, represented by a pair of Föppl point vortices, and the combined effect of multiple obstacles. The drift in various configurations is determined using methods of complex analysis and careful numerical computations. It is demonstrated that, while the total drift increases with the size of the wake for large vortex strengths, it is actually decreased for small circulation values. We also discuss how the interaction of two obstacles affects the drift in comparison to the case of two isolated obstacles. In particular, we identify the lower and upper bound on the drift due to two identical cylinders. In certain cases our results are supported by asymptotic analysis. A physical explanation of the observed affects is offered in terms of the trajectories of individual particles.

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