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Analysis of the two-phase flow in the wake of a transom stern[1]
KELLI HENDRICKSON, Massachusetts Institute of Technology - MIT, GABRIEL WEYMOUTH, University of Southampton, DICK YUE, Massachusetts Institute of Technology - MIT — The objective of this effort is to understand the physical and air entrainment characteristics of the two-phase flow in the wake of a transom stern. High-resolution numerical simulations are performed on the wake of a canonical transom stern at large scales using conservative Volume-of-Fluid (cVOF) and implicit Large Eddy Simulation (iLES). Boundary Data Immersion Method (BDIM) is used to simulate the dry transom stern wake region at three different Froude numbers and two different effective viscosities. A novel Lagrangian cavity identification algorithm based on computer graphics techniques enables the analysis of the temporal evolution of the entrained air cavities. Analysis of the simulation results for the flow structure and air entrainment of the large air cavities will be presented, including the scaling with ship parameters.

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