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Drag force acting on an ellipsoidal bubble with fore-aft asymmetry TOSHIYUKI SANADA, Shizuoka University, MINORI SHIROTA, Hirosaki University — We evaluate the drag force acting on an ellipsoidal clean bubbles rising steadily by experiments and numerical analysis. Flow fields and bubble shapes are obtained using a numerical simulation, which is based on a finite-difference solution of the equation s of motion on an orthogonal curvilinear coordinate system. Bubble motion in eight different clean liquids are also observed using high-speed photography. Photochromic dye is used to visualize the rear vortex structure. The degree of fore-aft asymmetric bubble shape is quantitatively evaluated using Legendre polynomials. It is confirmed that the existence of standing eddy hardly changes the drag even in the case with fore-aft asymmetry of bubble shape. It is also found that non-dimensional steady drag acting on a bubble has a liner relation with aspect ratio. The discrepancy of drag coefficients between analytical theory and experimental results is discussed.

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