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Numerical simulations of bubble dynamics at high Reynolds numbers[1] SAUL PIEDRA, EDUARDO RAMOS, Center for Energy Research-UNAM, TERMOCIENCIAS TEAM — We present a three-dimensional numerical simulation of air bubbles rising in water. The analysis is based on the solution of the conservation equations combined with a front tracking method to represent an interface between two immiscible fluids. The interfacial forces incorporate the effect of the surface tension and the material properties of the fluids are calculated in the entire integration domain. In order to follow the bubbles along thousands of diameters in its ascending motion, a moving reference frame technique is used. The shape of the bubbles, the pressure and the velocity fields at different flow conditions calculated with our model are in agreement with experimental observations reported in the literature. Also, the qualitative change in the trajectory of the bubbles from rectilinear to zig-zag to helical motion is reproduced by the model. Dominant physical effects in each mode of displacement are described.

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