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Lagrangian simulation of bubble entrainment by a vortex ring¹ ZHIWEI WANG, BIN CHEN, State Key Laboratory of Multiphase Flow in Power Engineering, Xi¹an Jiaotong University, PR China — In present paper the bubble entrainment by a vortex ring is numerically investigated by Lagrangian-Lagrangian method. The motion of vortex ring is simulated by a three-dimensional vortex filament model, in which vortex rings initially are discretized into individual elements with finite spherical cores placed on the centerline of the ring. The velocity field can be obtained by summing the contribution of all individual elements using the Biot-Savart law. The model has been validated by the comparation with theoretical solution of a circular vortex ring. Then based on the analysis of forces acting on bubbles entrained by a vortex ring, bubble dynamic equation is coupled into the three-dimensional vortex model and then bubble trajectories can be obtained accordingly. The trajectory of single bubble is computed and the well agreement between numerical simulation and the experimental observation validated our coupling model.

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