عنوان مقاله:

Parametric study on the stability of a liquid jet using VOF method

محل انتشار:

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خلاصه مقاله:

The object of the study is to investigate the behavior of liquid jet which is discharged in to air. This problem has great importance in aerospace engineering especially in lubrication of the airplane engines such as bearing box lubrication. The main adventage of this study is consideration of the second phase of the flow which is air in this study. The problem is numerically simulated by using volume of fluid (VOF) method which is based on conservation of each fluid in the domain. Surface tension effect is also considered by including surface tension as a volumetric force in Navier-stokes equations. Because our numerical simulation is unsteady, Navier-Stokes equation is solved by explicit projection method. Both Navier-Stokes equation and interface tracking equation are solved in each time step. The simulation is performed for different inlet velocities, also the effect of jet diameter is studied. Critical velocities are found for different inlet diameters which beyond these values the effect of gravity is negligible. Also it is found that by reducing the diameter of the liquid jet this critical velocity also reduced respectively. In order to verify the code used for the numerical simulation, dam break problem is simulated and numerical results are compared with available experimental data. Comparison of the numerical results with available experimental data reveals the accuracy of the method.

کلمات کلیدی:

instability-liquid jet-VOF-surface tension-multiphase

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