

Abstract Submitted
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Modelling of bubble trajectories in a pump impeller¹ MARINE DUPOIRON, PAUL LINDEN, Cambridge Univ. — A vertical rotating flow in an annulus gap with an increasing diameter is used to approximate the flow in a pump impeller. We study a spherical gas bubble released at the flow inlet, subject to turbulent drag and added mass forces. Bubbles trajectories have been computed for different geometries, rotation speeds and bubble size, showing a deviation from the liquid streamlines in the angular and radial directions. This effect is related to the pump performance in multiphase conditions: the velocity difference between the gas and the liquid phases changes the final pressure rise produced by the impeller. In some extreme cases, the centrifugal force can be large enough to prevent bubbles from exiting the impeller at all, leading to an unwanted gas accumulation and the blockage of the pump. We eventually quantify the effects of geometrical and operational parameters on the pump behaviour.

¹Work done in collaboration with Schlumberger Gould Research, Cambridge

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