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Numerical Study of the Cavitating Flow through a Venturi Section by Means of OpenFOAM and Gmsh Tool

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Abstract **-** The present work focuses on the numerical study of the cavitating flow through a Venturi section by applying a scale adaptive simulation model. This study aims to understand the topology and unstable behavior of the cavitation cloud, which includes cavities formation as well as its collapse. Based on computational fluid dynamics, a methodology was developed to analyze the different stages of cavitating flow under the open-source guidelines. In this context, the numerical study was performed using OpenFOAM's environment with the help of the Gmsh meshing tool. For the resolution of Navier-Stokes equations, the PIMPLE algorithm was used considering a RANS equations approximation. Besides, the k-omega SST SAS turbulence model and the Zwart-Gerber-Belamri (ZGB) cavitation model were applied to study phase changes that occurs in the phenomenon. The obtained results of the present research show that the proposed methodology can reproduce the cavitation problem through a Venturi section with enough accuracy compared with experimental data and previous numerical simulations.

Keywords**:** Numerical study, cavitation, Venturi, Gmsh, OpenFOAM