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Compressible cavitation with stochastic field method ANDREAS CLASS, JULIEN DUMOND, Karlsruhe Institut of Technology — Non-linear phenomena can often be well described using probability density functions (pdf) and pdf transport models. Traditionally the simulation of pdf transport requires Monte-Carlo codes based on Lagrange particles or prescribed pdf assumptions including binning techniques. Recently, in the field of combustion, a novel formulation called the stochastic field method solving pdf transport based on Euler fields has been proposed which eliminates the necessity to mix Euler and Lagrange techniques or prescribed pdf assumptions. In the present work, part of the PhD Design and analysis of a Passive Outflow Reducer relying on cavitation, a first application of the stochastic field method to multi-phase flow and in particular to cavitating flow is presented. The application considered is a nozzle subjected to high velocity flow so that sheet cavitation is observed near the nozzle surface in the divergent section. It is demonstrated that the stochastic field formulation captures the wide range of pdf shapes present at different locations. The method is compatible with finite-volume codes where all existing physical models available for Lagrange techniques, presumed pdf or binning methods can be easily extended to the stochastic field formulation.

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