

Abstract Submitted
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Numerical Simulation of Compressible Multi-phase flows using HLLC extension of AUSM+-up Scheme¹ GAURAV DHIR, PEC University of Technology, KOWSIK BODI, IIT Bombay — Solving Multi-fluid equations has always required an onerous effort from researchers with regards to implementing an appropriate numerical scheme which could capture the various facets of such type of flows along with the interaction between the various phases present. Additionally, multi-phase flows bring with them peculiar mathematical properties such as non-hyperbolicity and non-conservativeness which further increases the complexity involved. Our presentation shall present an insight into the advantages and limitations of several numerical schemes proposed in the past and propose to use the HLLC extension of AUSM+-up approach to model such type of flows. We use the single pressure based stratified flow concept and by presenting several test cases, we prove that our method robustly computes multi-phase flow involving discontinuities, such as shock waves and fluid interfaces. Additionally, we present a formulation to incorporate phase transition within multi-fluid equations and establish the validity of this method by presenting several two dimensional test cases such as the Shock-Water Column Interaction problem, the Water-Shock/Air Bubble Interaction problem and the 2D Underwater Explosion problem.

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