

Highly accurate methods for conservative two-phase flow models

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We present a class of high-order weighted essentially nonoscillatory (WENO) reconstructions based on relaxation approximation of two-phase flow models. The emphasis is a two-phase flows encountered in gas-liquid applications with velocity non-equilibrium. The governing equations yield a hyperbolic system of six conservation laws subjected to a variety of closure equations. The main advantage of combining the WENO schemes with relaxation approximation is the fact that the presented schemes avoid solution of the Riemann problems due to the relaxation approach and high-resolution is obtained by applying the WENO approach. In this study the focus is on a fifth-order scheme and its performance for solving a wide class of applications in two-phase flows. To show the effectiveness of these methods, we present numerical results for different test problems and comparison to other solvers. The numerical results demonstrate the ability of the proposed method to offer efficient and accurate simulations.

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