Abstract Submitted
for the DFD20 Meeting of
The American Physical Society

Recovery-Assisted Discontinuous Galerkin Discretization for Compressible Multiphase Flows[1] LOC KHIEU, ERIC JOHNSEN, The University of Michigan — Since the beginning of CFD, the striving for accurate simulations has been relentless, and discontinuous Galerkin (DG) method is among the recent developments, arguably the most popular. Its substantial potential lies in its ability to systematically produce numerical schemes of arbitrarily high orders of accuracy on a compact computational stencil. Recovery-assisted discontinuous Galerkin (RAD) is our own development, aiming at further improving the conventional advection–diffusion DG scheme (upwind DG for advection and BR2 for diffusion) with respect to accuracy, while retaining the stencil compactness. In RAD, the diffusion terms are discretized by a combination of Van Leer's recovery concept (known for its accuracy) and the mixed formulation (widely used for its compactness, among others). For advection terms, the numerical solution is first enhanced by applying recovery in a biased manner, then the interface fluxes are calculated via upwinding. The resulted scheme is then coupled with a Riemann solver suitably modified for multiphase flows, then a variety of binary multiphase problems are simulated to verify RAD's numerical performance.

[1]This material is based upon work supported by the US Department of Energy, Office of Science, Office of Basic Energy Sciences under contract number DE-AC05-00OR22725, and was supported in part by the Department of Energy grant DE-NE0008747.

Loc Khieu
University of Michigan

Date submitted: 04 Aug 2020 Electronic form version 1.4