NCM Workshop on hyperbolic conservation laws: Computational exercises

Praveen Chandrashekar and Rakesh Kumar

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1. Implement Roe, HLL and HLLC fluxes into `euler1d/euler_fo.F90`. Compare results from different fluxes for Sod test case.

2. Implement the following in `euler1d/euler_ho_1.F90`

   (a) Other fluxes as in previous question.
   (b) Periodic and solid wall boundary conditions
   (c) Characteristic limiting
   (d) Advection test case with periodic bc
   (e) Sod test with sonic rarefaction
   (f) Shu-Osher test case with solid wall bc
   (g) 123 problem
   (h) Interaction of blast waves

   For advection test, measure error norm and estimate convergence rate. For Shu-Osher test case, compare different fluxes and reconstruction schemes.

3. Write a finite difference WENO version of 1-D Euler solver. (Use `euler1d/euler_ho_1.F90` as starting point.)

4. Write a 2-D, second order, finite volume code for Euler equations to solve isentropic vortex test case. (Use `euler2d/fdweno.F90` as starting point.)