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Simulation of Compressible Flows and Shock Turbulence Interaction Using Observable Euler and Navier-Stokes Equations MAJID ALLAHYARI, KAMRAN MOHSENI, Univ of Florida - Gainesville — We present the results of numerical simulation of several canonical problems involving shock and turbulence based on an inviscid regularization technique, termed the observable method. This technique applies the observable divergence theorem to the conservation laws to obtain the observable version of Euler and Navier-Stokes equations. The method is completely inviscid, does not introduce artificial dissipation, and eliminates the need for complex numerical schemes. Simulations of shock-vorticity/entropy wave interaction and decaying three-dimensional homogeneous isotropic turbulence demonstrate the good performance of the observable method. Moreover, the presented method shows consistent results compared to the DNS results for a canonical shock-turbulence interaction problem.

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