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DG-FDF solver for large eddy simulation of compressible flows

SHERVIN SAMMAK, University of Pittsburgh, MICHAEL BRAZELL, DIMITRI MAVRIPLIS, University of Wyoming, PEYMAN GIVI, University of Pittsburgh — A new computational scheme is developed for large eddy simulation (LES) of compressible turbulent flows with the filtered density function (FDF) subgrid scale closure. This is a hybrid scheme, combining the discontinuous Galerkin (DG) Eulerian solver with a Lagrangian Monte Carlo FDF simulator. The methodology is shown to be suitable for LES, as a larger portion of the resolved energy is captured as the order of spectral approximation increases. Simulations are conducted of both subsonic and supersonic flows. The consistency and the overall performance of the DG-FDF solver are demonstrated, together with its shock capturing capabilities.

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