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A Runge Kutta Discontinuous Galerkin Method for Lagrangian Compressible Euler Equations in Two-Dimensions

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Abstract : This paper presents a new cell-centered Lagrangian scheme for two-dimensional compressible flow. The new scheme uses a semi-Lagrangian form of the Euler equations. The system of equations is discretized by Discontinuous Galerkin (DG) method using the Taylor basis in Eulerian space. The vertex velocities and the numerical fluxes through the cell interfaces are computed consistently by a nodal solver. The mesh moves with the fluid flow. The time marching is implemented by a class of the Runge-Kutta (RK) methods. A WENO reconstruction is used as a limiter for the RKDG method. The scheme is conservative for the mass, momentum and total energy. The scheme maintains second-order accuracy and has free parameters. Results of some numerical tests are presented to demonstrate the accuracy and the robustness of the scheme.

Keywords : cell-centered Lagrangian scheme, compressible Euler equations, RKDG method
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