On the use of entropy viscosity based high order discontinuous spectral element method for capturing shocks ARNAB CHAUDHURI, Department of Aerospace Engineering and Engineering Mechanics, San Diego State University, San Diego, CA, 92182, HESAM ABBASSI, Department of Mechanical and Industrial Engineering, University of Illinois at Chicago, Chicago, IL, 60607, GUSTAAF B. JACOBS, Department of Aerospace Engineering and Engineering Mechanics, San Diego State University, San Diego, CA, 92182, FARZAD MASHAYEK, Department of Mechanical and Industrial Engineering, University of Illinois at Chicago, Chicago, IL, 60607 — A modified entropy viscosity (EV) based high order discontinuous spectral element method (DSEM) has been proposed to deal with compressible flows involving shocks. Particular attention has been made to control undesired artificial dissipation dictated by entropy generation in shock-free shear dominated regions of the flow-field. A shock sensor based EV switch is used for this purpose. Implementation of the proposed method on an existing 3D parallel DSEM solver is successfully verified and validated with numerous benchmark problems. The effectiveness and applicability of stabiliser filters together with EV switch for various steady and unsteady flow configurations involving flow discontinuities are also tested. Results of simulations of compressible subsonic-to-supersonic flows over ramped cavity geometry, moving shocks over wedge involving regular/irregular Mach reflections are presented.

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