

Abstract Submitted
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Multidimensional optimization of non-linear shock capturing schemes RAYNOLD TAN YIYUN, ANDREW OOI, RICHARD SANDBERG, University of Melbourne — In this work, a quasi-linear semi-discrete analysis of shock capturing schemes in multi-dimensional wavenumber space is proposed. Using the dispersion relation of the two dimensional convection and linearized Euler equations, the spectral properties of a spatial scheme can be quantified in two dimensional wavenumber space. A hybrid scheme which combines the merits of the Minimum Dispersion and Controllable Dissipation (MDCD) scheme with the Targeted Essentially Non-Oscillatory (TENO) scheme was developed. Using the proposed analysis framework, the hybrid scheme was spectrally optimized in multidimensional wavenumber space such that the linear part of the scheme can be separately optimized for its dispersion and dissipation properties. In order to demonstrate the improved spectral properties of the new scheme, a series of one dimensional and multidimensional numerical tests were conducted.

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