

Abstract Submitted
for the DFD05 Meeting of
The American Physical Society

An Optimized WENO Smoothness Measurement for the Direct Numerical Simulation of Compressible Turbulent Flow¹ MINWEI WU, ELLEN TAYLOR, M. PINO MARTIN, Princeton University — The adaption mechanism and dissipation properties of a bandwidth-optimized weighted essentially non-oscillatory (WENO) scheme for the direct numerical simulation of compressible turbulence are discussed and an optimized WENO smoothness measurement is introduced. We find that the new smoothness measurement results in reduced numerical dissipation. In turn, accurate flow fields of isotropic turbulence can be obtained using coarser grids than those required with the original smoothness measurement. In addition, the modified smoothness measurement gives better results for shockwave and turbulent boundary layer interaction flows.

¹Funded by the AFOSR Grant number AF/F49620-02-1-0361

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Date submitted: 10 Aug 2005

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