

Abstract Submitted
for the DFD17 Meeting of
The American Physical Society

Bound-preserving Legendre-WENO finite volume schemes using nonlinear mapping¹ TIMOTHY SMITH, CARLOS PANTANO, University of Illinois at Urbana-Champaign — We present a new method to enforce field bounds in high-order Legendre-WENO finite volume schemes. The strategy consists of reconstructing each field through an intermediate mapping, which by design satisfies realizability constraints. Determination of the coefficients of the polynomial reconstruction involves nonlinear equations that are solved using Newton's method. The selection between the original or mapped reconstruction is implemented dynamically to minimize computational cost. The method has also been generalized to fields that exhibit interdependencies, requiring multi-dimensional mappings. Further, the method does not depend on the existence of a numerical flux function. We will discuss details of the proposed scheme and show results for systems in conservation and non-conservation form.

¹This work was funded by the NSF under grant DMS 1318161

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Date submitted: 25 Jul 2017

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