SEASEN Session 3 (Nonlinear Evolution PDEs) Speaker 1

Mapped WENO Schemes for Hyperbolic Equations

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Hyperbolic conservation laws are simulated via low-dissipation and high-resolution numerical methods. Weighted Essentially Non-oscillatory (WENO) schemes, with nonlinear combinations of a set of substencils, provide these necessary characteristics to capture the strong discontinuities and the smooth microstructures of compressible flow fields. In this talk, we present a modification of the standard WENO methods through a new mapping of the nonlinear weights that mimics the nesting of outer and inner subschemes to maximize the order of convergence on stencils containing discontinuities. In 1D and 2D, numerical results with the Euler Equations have shown solutions with sharper representations of shocks and high gradients.

This is joint work with D. Barreto, R. Borges and S. Santos.