

Computation of Entropy Measure-Valued Solutions

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Abstract: Entropy stability plays an important role in the dynamics of non-linear hyperbolic systems of conservation laws. Entropic solutions need not be unique. Instead, they could be interpreted in an averaged sense as measure-valued solutions, as an ensemble average in configuration space. We revisit the general framework of numerical entropy stability for difference approximations of such nonlinear equations. Our approach is based on comparing numerical viscosities with entropy conservative schemes. We demonstrate this approach with a host of high order entropic schemes. In particular, this paradigm serves as the building block for a class of non-oscillatory entropic schemes of arbitrarily high-order of accuracy, called TeCNO schemes. Numerical experiments provide a remarkable evidence for the effectiveness of the TeCNO schemes. These include recent TeCNO-based computation of entropy measure valued solutions.

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